87-502

No. _____

Supreme Court, U.S.
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IN THE

Supreme Court of the United States

OCTOBER TERM, 1987

ARCO OIL AND GAS COMPANY, DIVISION OF ATLANTIC RICHFIELD COMPANY,
Petitioner,

v.

WILLISTON BASIN INTERSTATE PIPELINE COMPANY AND FEDERAL ENERGY REGULATORY COMMISSION,
Respondent.

APPENDICES TO PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT AND LIST OF PARENT COMPANIES, SUBSIDIARIES, AND AFFILIATES REQUIRED BY RULE 28.1

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TABLE OF CONTENTS

DESCRIPTION		Page
APPENDIX A—	Opinion of the United States Court of Appeals for the District of Columbia Circuit in *Williston Basin Interstate Pipeline Company* v. *Federal Energy Regulatory Commission*, No. 85-1835, 816 F.2d 777 (D.C. Cir. 1987)	1a
APPENDIX B—	Order No. 338 of the Federal Energy Regulatory Commission issued October 7, 1983 in Docket Nos. RM79-76-151 (Wyoming-14) and RM-79-76-152 (Wyoming-15), 48 Fed. Reg. 46268 (Oct. 12, 1983), FERC Statutes and Regulations Preambles (CCH) ¶ 30,505 (1983)	14a
	Order No. 338-A of the Federal Energy Regulatory Commission issued November 6, 1985, in Docket Nos. RM79-214, RM79-76-215, RM79-76-228, and RM79-76-229 (Wyoming 14 & 15), Denying Request for Rehearing Petition to Reopen and Remand, 33 FERC (CCH) ¶ 61,175 (1985)	20a
	Order No. 99, Docket No. RM79-76, *Regulations Covering High-Cost Natural Gas Produced from Tight Formations*, issued August 15, 1980, 45 Fed. Reg. 56034 (August 22, 1980), FERC Statutes and Preambles (CCH), § 30,183 (1980)	29a
	Order No. 99-A, Docket No. RM79-76, *High Cost Natural Gas Produced from Tight Formations*, Order Denying Rehearing and Clarifying Order No. 99, issued October 21, 1980, 45 Fed. Reg. 71563 (October 29, 1980), FERC Statutes and Preambles ¶ 30,198 (1980)	71a

TABLE OF CONTENTS—Continued

		Page
APPENDIX C—	Judgment and Orders of the United States Court of Appeals for the District of Columbia Circuit in *Williston Basin Pipeline Company, Petitioner* v. *Federal Energy Regulatory Commission, Respondent, ARCO Oil and Gas, Intervenor,* No. 85-1835:	
	Judgment (April 24, 1987)	78a
	Order denying Petitioner's Petition for Rehearing (June 30, 1987)	80a
	Order Denying Petitioner's suggestion for Rehearing *En Banc* (June 30, 1987)	81a
	Letter to General Counsel of Federal Energy Regulatory Commission in lieu of formal mandate transmitting Court's opinion and certified copy of judgment filed April 24, 1987 (July 15, 1987)	82a
APPENDIX D—	Statutory Provisions:	
	Natural Gas Policy Act of 1978, 15 U.S.C. §§ 3301-3432 (Supp. V 1981):	
	§ 107, 15 U.S.C. § 3317	83a
	§ 501, 15 U.S.C. § 3411	85a
	§ 503, 15 U.S.C. § 3413	86a
	§ 506, 15 U.S.C. § 3416	94a
APPENDIX E—	Regulations uder the Natural Gas Policy Act:	
	Part 271, Subpart G—High Cost-Natural Gas, 18 C.F.R. § 271.703, *et seq.*	98a
APPENDIX F—	List of Parent Companies, Subsidiaries, and Affiliates Required by Rule 28.1	212a

APPENDIX A

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 85-1835

WILLISTON BASIN INTERSTATE PIPELINE COMPANY,
Petitioner

v.

FEDERAL ENERGY REGULATORY COMMISSION,
Respondent

ARCO OIL AND GAS COMPANY,
Intervenor

Petition for Review of an Order of the
Federal Energy Regulatory Commission

Argued December 9, 1986

Decided April 24, 1987

Robert T. Hall, III for petitioner.

John Conway, Attorney, Federal Energy Regulatory Commission, with whom *Barbara J. Weller*, Deputy Solicitor, Federal Energy Regulatory Commission was on the brief for respondent. *Jerome M. Feit*, Solicitor, *John N. Estes, III* and *Philip M. Marston*, Attorney, Federal Energy Regulatory Commission entered appearances for respondent.

Carroll L. Gilliam, with whom *J. Paul Douglas* and *Charles F. Hosmer* were on the brief for intervenor.

Carol A. Smoots and *David J. Muchow* were on the brief for *amicus curiae*, The American Gas Association, urging reversal.

Before: BORK and D. H. GINSBURG, *Circuit Judges*, and MCGOWAN, *Senior Circuit Judge*.

Opinion for the Court filed by *Circuit Judge* D. H. GINSBURG.

D. H. GINSBURG, *Circuit Judge*: In Orders No. 338 [1] and 338-A,[2] the Federal Energy Regulatory Commission ("FERC" or the "Commission") designated four natural gas formations as "tight formations," thereby qualifying their output for higher, so-called "incentive" prices under section 107(c)(5) of the Natural Gas Policy Act of 1978 (NGPA).[3] ARCO Oil and Gas Co. (ARCO) owns the gas rights to these formations, and has contracted to sell the gas to Montana-Dakota Utilities Co. (MDU),[4] which under the sales contract, must pay an incentive price if the gas qualifies for such pricing. MDU opposed ARCO's application to FERC for "tight formation" designations, and now appeals the two orders, seeking their reversal.

MDU raises two principal grounds for reversal. First, MDU contends that it was arbitrary and capricious for FERC to rely on its own previous Order No. 99,[5] which

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[1] 48 Fed. Reg. 46,268; FERC Statutes and Regulations (CCH) ¶ 30,505 (1983).

[2] 33 FERC (CCH) ¶ 61,175 (1985).

[3] 15 U.S.C. § 3317(c)(5) (1982). The NGPA was enacted into law by Pub. L. 95-621, 92 Stat. 3351 (1978).

[4] The contract was executed by MDU, which subsequently transferred its pipeline business to Williston Basin Interstate Pipeline Co., a wholly-owned subsidiary. In the opinion, we shall refer to both as MDU.

[5] "Regulations Covering High-Cost Natural Gas Produced From Tight Formations." 45 Fed. Reg. 56,034; FERC Statutes and Regulations (CCH) ¶ 30,183 (1980). The genesis of Order No. 99

established generic criteria for determining whether to grant "tight formation" designations in particular cases, despite evidence that the tight formation program was having unintended and undesirable consequences.[6] MDU

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is described at length in *Pennzoil Co. v. FERC*, 671 F.2d 119, 123-25 (5th Cir. 1982).

[6] MDU here refers the court to three government reports: (1) General Accounting Office, *Problems Identified in FERC's Incentive Pricing Program for Natural Gas from Tight Formations* (Rept. No. GAO/RCED-85-49) (1985) (contrary to the supposition underlying the Conference Report on NGPA and Order No. 99, developing tight formations is not generally riskier or costlier than developing non-tight formations); (2) Department of Energy, *First Report Required by Section 123 of the Natural Gas Policy Act of 1978* (Rept. No. DOE/PE-0054) (1984) (incentive prices of tight formation gas above prices of substitute fuels, inducing producers prematurely to abandon lower-cost wells in favor of higher-cost but more profitable ones); and (3) Department of Energy, *Increasing Competition in the Natural Gas Market: The Second Report Required by Section 123 of the Natural Gas Policy Act of 1978* (Rept. No. DOE/PE-0069) (1985) (*accord*); as well as to (4) FERC's own proposed rulemaking, "Limitation on Incentive Prices for High-Cost Gas to Commodity Values," 48 Fed. Reg. 7469; FERC Proposed Regulations (CCH) ¶ 32,294 (1983).

In the proposed rulemaking, FERC disclosed that, contrary to expectation, in recent years lower demand for natural gas had coincided with higher prices, above the market-clearing level. This anomaly, in FERC's opinion, was "due both to the pricing mechanisms built into the NGPA and the contracting practices of pipelines and producers" which "do not permit downward pricing flexibility." *Id.*, 48 Fed. Reg. at 7470. FERC therefore proposed to "cap" the Order No. 99 incentive price for wells drilled after the date of the proposal's publication. After comments were submitted, however, FERC terminated the rulemaking without adopting any new rule or otherwise amending Order No. 99. *See* Order No. 459, 51 Fed. Reg. 44,634; FERC Statutes and Regulations (CCH) ¶ 32,432 (1986). In so doing, FERC cited both a need for updated information and the recent promulgation of Order No. 451, which more broadly altered the pricing structure for natural gas in the hope of restoring prices to the market-clearing level. *See* Order, No. 451, 51 Fed. Reg. 22,168; FERC Statutes and Regulations (CCH) ¶ 30,701 (1986).

renews the argument which FERC rejected in Order No. 338-A that the agency must abandon the use of the Order No. 99 generic criteria and make case-by-case determinations of when incentive prices are necessary, in keeping with its statutory duty to permit incentive pricing only when "necessary to provide reasonable incentives for . . . production." [7] Second, MDU argues that even if FERC could properly rely on the criteria set out in Order No. 99, its conclusion that these four formations satisfied those criteria was arbitrary and capricious because FERC relied upon misleading data and used flawed methodologies in analyzing them.

We do not reach either of MDU's arguments, however, because we lack jurisdiction of MDU's petition to review FERC's orders, as explained below.

I.

Responding to a 1977 presidential report indicating that regulation under the Natural Gas Act of 1938 [8] had resulted in underpricing, excess demand, and insufficient supplies of natural gas, Congress passed the NGPA in order to bring natural gas prices closer to the price of fuel substitutes. The NGPA provided for substantial deregulation of natural gas prices by 1985, after a transitional period intended to encourage production from new sources.

In order to encourage development of sources considered unprofitable at the existing price ceiling, the NGPA authorized sellers of certain types of gas to charge higher incentive prices; the eligible categories are "new natural gas," [9] "Outer Continental Shelf gas," [10] gas from a "new,

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[7] NGPA § 107(b), 15 U.S.C. § 3317(b).

[8] 52 Stat. 821 (1938) (codified as amended at 15 U.S.C. §§ 717-717w (1982)).

[9] NGPA § 102(c), 15 U.S.C. § 3312(c).

[10] NGPA § 102(d), 15 U.S.C. § 3312(d).

onshore production well," [11] "stripper well natural gas," [12] and "high-cost natural gas." [13] The NGPA specifies the generic criteria defining each of these categories except for "high-cost natural gas," which is described as including gas from certain specified types of sources ("geopressured brine," "coal seams," and "Devonian shale"),[14] as well as gas "produced under such other conditions as the Commission determines to present extraordinary risks or costs." NGPA § 107(c) (5).[15] The Conference Report states that FERC might include within the high-cost gas category "natural gas produced from tight formations with little permeability, including Western tight sand formations . . . ." [16] Since section 107(b) authorizes FERC to set a higher price only "to the extent that such special price is necessary to provide reasonable incentives for the production of such high-cost natural gas," [17] however, FERC may grant the "tight formation" designation only in situations where it is satisfied that the incentive price is needed in order to make high-cost gas worth exploiting. *See Pennzoil Co. v. FERC*, 671 F.2d 119, 123-125, 127 (5th Cir. 1982).

Section 503 of the NGPA [18] outlines the procedures for determining whether specific gas falls within a given category of gas entitled to incentive pricing. It is spe-

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[11] NGPA § 103(c), 15 U.S.C. § 3313(c).

[12] NGPA § 108(b), 15 U.S.C. § 3318(b).

[13] NGPA § 107(c), 15 U.S.C. § 3317(c).

[14] NGPA § 107(c)(2)-(4), 15 U.S.C. § 3317(c)(2)-(4).

[15] 15 U.S.C. § 3317(c)(5).

[16] Joint Explanatory Statement of the Committee on Conference, Natural Gas Policy Act of 1978, H.R. Rep. No. 95-1752, 95th Cong., 2d Sess., 87 (1978). The Report is reprinted in [1978] U.S. Code Cong. & Ad. News 8800, 8983.

[17] 15 U.S.C. § 3317(b).

[18] 15 U.S.C. § 3413.

cifically to be used for "applying the definition of high-cost natural gas under section 107(c)," [19] a responsibility that Congress divided between FERC and the state or federal "jurisdictional agency" that governs the drilling of wells on the particular site for which high-cost designation is requested. Unless the jurisdictional agency waives its role, in writing, it is to make the initial determination of whether specific gas satisfies the factual criteria for a particular category of incentive-priced gas.[20] As the Conference Report clearly states, the "determination made by such State or Federal agency includes the subsidiary determinations required to be made to determine the category for which natural gas production qualifies." [21]

FERC reviews the jurisdictional agency's factual determinations to ensure that they are supported by "substantial evidence." [22] Judicial review is subsequently

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[19] NGPA § 503(a)(1)(D), 15 U.S.C. § 3413(a)(1)(D). *See* NGPA § 107(c)(5), 15 U.S.C. § 3317(c)(5) ("For purposes of this section, the term 'high-cost natural gas' means natural gas determined in accordance with section 503 to be . . . produced under such other conditions as the Commission determines to present extraordinary risks or costs.").

[20] NGPA 503(a)(1), (c)(1)-(2), 15 U.S.C. § 3413(a)(1), (c)(1)-(2).

[21] The Conference Report goes on to state:

> For example, in determinations regarding new natural gas [NGPA § 102(c), 15 U.S.C. § 3312(c)], the agency determinations would include deciding whether a new well is outside the 2.5 miles distance from a marker well; or whether natural gas is behind-the-pipe or withheld, within the definitions specified in the appropriate sections, as may be further defined by the Commission.

H.R. Rep. No. 95-1752, at 117.

[22] NGPA § 503(b)(1)(A), 15 U.S.C. § 3413(b)(1)(A). The Conference Report discusses at some length FERC's role in reviewing jurisdictional agency determinations:

[Continued]

available only if FERC reverses the jurisdictional agency's determinations; judicial review is not available if FERC upholds those determinations. *See Mesa Petroleum Co. v. FERC*, 688 F.2d 1014 (5th Cir. 1982). This distinction is embodied in sections 503(b)(4)(B) and (c)(4) of the NGPA:[23] the latter provision states that jurisdictional agency determinations "shall not be subject to judicial review under any Federal or State law except as provided in subsection [503(b)]" which, at paragraph (4)(B), provides for judicial review only when FERC *reverses* a jurisdictional agency recommendation.[24] In such a case, the court is itself supposed to review the jurisdictional agency's determinations, not those of

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[22] [Continued]

> The State or Federal agency determination must then be submitted to the Commission for review, accompanied by such substantiation as the Commission may require. The Commission may reverse the State or Federal agency classification if it finds that such determination is not supported by substantial evidence . . . .
>
> The conferees intend that the Commission's authority to review State or Federal agency determinations shall be limited to determining the narrow question of whether or not the agency determination is supported by substantial evidence. The conferees have followed the traditional definition of substantial evidence review; that is, there is no intention to allow the Commission to "second guess" the agency by independently weighing the evidence and reversing the agency's determination as if the initial responsibility to make the determination were placed within the Commission. If the Commission determines that substantial evidence exists for the State or Federal agency's determination, the Commission's inquiry and reviewing responsibilities terminate.

H.R. Rep. No. 95-1752, at 117-18.

[23] 15 U.S.C. § 3413(b)(4)(B), (c)(4).

[24] NGPA § 503(b)(4)(B), 15 U.S.C. § 3413(b)(4)(B). The Conference Report states that "[t]he Commission's action in *reversing* a State or Federal agency determination is subject to judicial review." H.R. Rep. No. 95-1752, at 118 (emphasis added).

FERC, and is itself supposed to apply the substantial evidence test.[25]

The formations in the case before us were on federal lands, and the jurisdictional agency was the Bureau of Land Management (BLM) of the United States Department of the Interior. The BLM made the factual determinations necessary under Order No. 99[26] and recommended that FERC grant the "tight formation" designations. Upon review, FERC found that those determinations were supported by substantial evidence.[27]

II.

MDU concedes that if section 503 governs the grant of "tight formation" designations in this case, then no appeal lies because FERC upheld the jurisdictional agency's recommendation. Nonetheless, all the parties (including FERC) contend that judicial review is authorized here because, they reason, FERC did not act under section 503 at all in granting the "tight formation" designations

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[25] NGPA § 503(b)(4)(B), 15 U.S.C. § 3413(b)(4)(B). The Conference Report States that:

> The conferees intend that the question of whether the State or Federal agency determination is supported by substantial evidence shall be a question of law. The Commission's determination of this question may be reversed by the court if it is not in accordance with the requirements of law; the Commission's determination to reverse a State or Federal agency determination must be based on a finding that there was no substantial evidence for such determination.

H.R. Rep. No. 95-1752, at 118. *See L & B Oil Co., Inc. v. FERC*, 665 F.2d 758, 762 (5th Cir. 1982).

[26] The substantive criteria of Order No. 99 are set forth in 18 C.F.R. § 271.703(c) (1986). There is no dispute that the factual determinations that must be made in order to determine whether a particular formation satisfies these criteria are the "subsidiary determinations" that, as Congress indicated in the Conference Report, are to be made by the jurisdictional agency.

[27] *See* Orders No. 338 and 338-A, *supra* notes 1-2.

in question.[28] They point out that in the rulemaking notices surrounding Order No. 99 FERC stated that it would make these case-by-case "tight formation" determinations not through the procedures of section 503 but rather through somewhat different procedures of its own devising,[29] for which it claimed authority in its broad rulemaking powers under section 501 of the NGPA.[30] Indeed, FERC purports to rely on Section 503 only in making the secondary determination of whether particular wells on a previously designated tight formation are entitled to incentive pricing (the basic question being the date on which the well was drilled).[31] According to the

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[28] After this case was argued, the court *sua sponte* called for briefs on the issue of jurisdiction.

[29] The procedure adopted by FERC, *see* 18 C.F.R. § 271.703, in many respects resembles section 503. In particular, Order No. 99 assigns primary fact-finding responsibility to the jurisdictional agencies, whose findings FERC reviews for substantial evidence.

[30] 15 U.S.C. § 3411.

[31] *See* 18 C.F.R. § 271.703(b)(2)-(3). In promulgating the "Interim Rule Covering High-Cost Natural Gas Produced From Tight Formations" that preceded Order No. 99, FERC stated that:

> The Commission does not believe that its authority to engage in the formation identification process is limited to a section 503 review of jurisdictional agencies' determinations. Section 503 describes the Commission's review authority only with respect to well category determinations. Moreover, pursuant to section 501 of the NGPA, the Commission has the authority to engage in any activity and to issue any rules it finds necessary to carry out its functions under the NGPA. One of the Commission's functions under section 107 is to identify gas which is produced under extraordinary risk or cost. Given that function, and its authority under section 501, the Commission is not constrained by section 503 as [one] commentator suggested.

45 Fed. Reg. 13414, 13416; FERC (CCH) ¶ 30,130 (1980). FERC did not specifically discuss sections 501 and 503 in Order No. 99, *see* 45 Fed. Reg. 56034, 56035-36, 56042; FERC (CCH) ¶ 30,183, but in Order No. 99-A, FERC reaffirmed its stance, stating that

parties, section 503 merely precludes judicial review of this well-specific determination when FERC agrees with the jurisdictional agency. They argue, though, that judicial review is available for FERC's granting of the initial "tight formation" designation, because section 506 of the NGPA [32] authorizes review of section 501 rulemakings. The parties argue that MDU therefore may seek review in this court of the "tight formation" designations in dispute here, notwithstanding the fact that FERC found the determinations of the jurisdictional agency (BLM) to be supported by substantial evidence.

III.

As we have stated, it is undisputed that the NGPA precludes an aggrieved person from appealing the grant of a "high-cost natural gas" designation when, under section 503, FERC has affirmed the jurisdictional agency recommendation. Whether MDU may appeal the grant of the "tight formation" designations in this case therefore depends on whether FERC may avoid the statutory bar to judicial review by purporting to grant these designations through a section 501 rather than a section 503 rulemaking. We must therefore determine, under *Chevron U.S.A. Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837, 843 (1984), whether FERC's interpretation of its rulemaking powers under the NGPA, insofar as it would permit judicial review of the "tight formation" designations at issue, conflicts with Congress' "unambiguously expressed intent," and if not, whether that interpretation is a "permissible construction" of sections 501 and 503.

It is rare for Congress' intent to be as "unambiguously expressed" as it is in this case. The Conference

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"[t]he Commission has the discretion to qualify tight formations under either section 503 or by rulemaking." 45 Fed. Reg. 71563, 71563-64; FERC Statutes and Regulations (CCH) ¶ 30,183 (1980).

[32] 15 U.S.C. § 3416.

Report indicates that the House and Senate originally disagreed on the procedural framework for determining what gas qualifies for incentive pricing:

> The House passed bill required the Commission to delegate the authority to determine which production qualifies as new natural gas produced from a newly discovered reservoir to the appropriate State regulatory agency upon the request of that agency. The Commission was authorized to set terms and conditions for such a delegation, to rescind such delegation, and, within one year, to reverse or modify any determination made by the State agency.
>
> . . .
>
> The Senate passed bill assigned the Commission authority to determine what natural gas qualifies as new natural gas.[33]

In resolving the differences between the two bills, therefore, Congress squarely confronted the question of what procedures should be used. If Congress had wanted to authorize FERC to choose the procedures under which these "high-cost natural gas" designations would be made, it could have stated so expressly or it could have remained silent on the question, impliedly leaving it to be decided through FERC's rulemaking authority under section 501. Congress, however, exercised neither of these options.

Instead, Congress crafted a new section 503, an apparent compromise between the House's preference for the States and the Senate's preference for FERC to determine what gas would qualify for incentive pricing. Moreover, Congress specifically stated in subsection (a)(1) that the procedures of section 503 apply to the granting of the incentive-price designations, including "high-cost natural gas" designations. Indeed, in sections 102(c)(1)(A)-(B), 103(a), 107(c), and 108(b),[34] Con-

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[33] H.R. Rep. No. 95-1752, at 116-17.

[34] 15 U.S.C. §§ 3312(c)(1)(A)-(B), 3313(a), 3317(c), and 3318(b).

gress *defined* the various categories of incentive-priced gas as that "natural gas determined in accordance with section 503" to satisfy the statutory or regulatory criteria.[35]

The parties' contention that FERC may avoid the specific procedures of section 503 by relying instead on its general rulemaking authority under section 501 renders section 503 nothing more than a mere suggestion from Congress for FERC to take or not as it likes. We cannot ascribe to Congress, which had explicitly rejected alternative procedures in favor of the detailed and extensive procedure in the statute, the intention of simply providing FERC with a possible approach to granting NGPA designations. Congress clearly intended that these designations would be made through the procedural scheme it enacted for that specific purpose, and section 503 was that scheme. FERC therefore may not avoid section 503's rules governing judicial review by relying on its section 501 rulemaking authority.[36]

IV.

We therefore hold that, as Congress stated in section 503(c)(4), judicial review of "tight formation" designations is available only as provided in section 503(b). In this case, the BLM determined that the ARCO formations satisfied the "tight formation" criteria set forth in Order No. 99, and FERC found that the BLM's factual determinations were supported by substantial evidence. Under

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[35] *See* H.R. Rep. No. 95-1752, at 117 ("The State or Federal agency with natural gas under its regulatory jurisdiction determines whether certain natural gas satisfies the required factual determinations to be classified as . . . high-cost natural gas under sec. 107 . . .").

[36] We do not need to determine whether the procedure that FERC actually substituted for the statutory procedure is in any way defective except insofar as it purports to culminate in an order reviewable in court.

section 503(b)(4), no further review is available. We cannot be a party to any attempt, by the manipulation of mere form, to make reviewable that which, in substance, Congress has made unreviewable.

Because we lack jurisdiction over it, the petition is

Dismissed.

APPENDIX B

[¶ 30,505]

48 F.R. 46268 (October 12, 1983).

18 CFR Part 271

[Docket Nos. RM79-76-151 (Wyoming-14), RM79-76-152 (Wyoming-15); Order No. 338]

High-Cost- Gas Produced From Tight Formations; Wyoming

Issued: October 7, 1983.

AGENCY: Federal Energy Regulatory Commission, DOE.

ACTION: Final rule.

SUMMARY: The Federal Energy Reulatory Commission is authorized by section 107(c)(5) of the Natural Gas Policy Act of 1978 to designate certain types of natural gas as high-cost gas where the Commission determined that the gas is produced under conditions which present extraordinary risks or costs. Under section 107 (c)(5), the Commission issued a final regulation designating natural gas produced from tight formations as high-cost gas which may receive an incentive price (18 CFR 271.703 (1983)). This rule established procedures for jurisdictional agencies to submit to the Commission recommendations of areas for designation as tight formations. This final order adopts the recommendation of the United States Department of the Interior, Bureau of Land Management, that the Frontier Formation, and the Muddy, Dakota and Lakota Formations located in Fremont County, Wyoming, be designated as tight formations under § 271.703(d).

EFFECTIVE DATE: This rule is effective November 7, 1983.

FOR FURTHER INFORMATION CONTACT: Tom Rattray, (202) 357-5447 or Victor H. Zabel, (202) 357-8616.

SUPPLEMENTARY INFORMATION: The Commission hereby amends § 271.703(d) of its regulations (18 CFR 271.703(d) (1983)) to include the Frontier Formation, and the Muddy, Dakota and Lakota Formations as designated tight formations eligible for incentive pricing under § 271.703. The amendments were proposed in Notices of Proposed Rulemaking by the Director, Office of Pipeline and Producer Regulation, issued November 22, 1982 (47 FR 53742 and 53743, November 29, 1982) based on a recommendation by the United States Department of the Interior, Bureau of Land Management (BLM), in accordance with § 271.703, that portions of the Frontier Formation and the Muddy, Dakota and Lakota Formations, located in Fremont County, Wyoming, be designated as tight formations.

Comments on the proposed rule were invited and two comments were received. Champlin Petroleum Company filed a comment supporting the recommendations. The other comment, contributed by Montana-Dakota Utilities Co. (MDU), opposed both recommendations. MDU raised a number of arguments in opposition to the proposed rules.

MDU raised several questions concerning the permeability guideline found in § 271.703(c)(2)(i)(A). MDU first argued that the average permeability values submitted in the recommendations are too low, and should be adjusted by the use of a correction factor in conjunction with the recommended formations. MDU estimated the correction factor by comparing the permeability calculated through pressure build-up testing with the cor-

responding permeability derived through core analysis testing. However, BLM states that MDU's correction factor for the adjustment of core analysis data is not applicable for the two recommendations because the cored intervals and the pressure build-up tested intervals are not identical. The Commission finds that substantial evidence in the record supports BLM's position.

MDU also noted that the permeability calculations were derived by using geometric mean, rather than arithmetic averaging in determining the formations' average permeability values. However, using the data submitted by BLM in support of its recommendations, the Commission has determined that the arithmetic averages for permeability values for the subject formations will also satisfy the Commission's guidelines in § 271.703(c)(2). Thus, the Commission need not address the issue of appropriate methodology in this order.

Section 271.703(c)(2)(i)(B) specifies according to the average depth to the top of the formation the maximum allowable stabilized production rate to be expected from the formation before stimulation. MDU contended that certain data concerning pre-stimulation flow rates which showed flow rates in excess of those permitted by § 271.703(c)(2)(i)(B) was not submitted to BLM. However, the data referred to by MDU, available on Petroleum Information (P.I.) scout cards, is based on drill stem testing in which the flow rate had not been established as required by § 271.703(c)(2)(i)(B). One of these reports was also determined to be a misprint. The Commission therefore agrees with BLM's findings that the information in question is not persuasive.

MDU next proposed that the flow rates from different formations tapped by the same well should be added together to obtain a single flow rate for each well. MDU contended that these aggregate flow rates exceed the flow rates allowed in § 271.703(c)(2)(i)(B) of the Commission's regulations. Section 271.703(c)(2)(i)(B) calls

for the use of pre-stimulation flow data, and, in the instant case, the aggregation of pre-stimulation flow rates will not exceed the limits prescribed in the Commission's regulations. Therefore, the Commission need not address the merits of MDU's aggregation proposal.

MDU further contended that infill drilling is present in the recommended areas, which requires the exclusion of certain spacing units from tight formation designation. However, the recommended area is located entirely within the Wind River Indian Reservation, which is not subject to any spacing rules, and is thus not subject to infill drilling as defined in § 271.703(b)(6) of the Commission's regulations. In addition, each well drilled in the recommended formations has been assigned a 320-acre parcel, in accordance with local custom and practice. There have been no infill wells drilled within the designated 320-acre parcels that would qualify as infill drilling even if the recommended areas were subject to state jurisdictional agency spacing rules. Therefore, no units within the recommended areas are subject to exclusion from tight formation designation under § 271.703(c)(2)(i)(D) of the Commission's regulations.

In addition, MDU objected to the inclusion of certain "flank" areas within the recommended area unless more evidence is presented to show that these areas exhibit tight formation characteristics. The scarcity of data regarding the "flank" areas, however, is due to a lack of commercially productive wells in the area. The geological information available on the "flank" areas supports the view that the sections meet the guidelines set forth in the Commission's regulations. Therefore, absent any conflicting data, the available evidence supports inclusion of the "flank" areas.

Finally, MDU contended that incentive pricing is not necessary in the recommended areas due to the production history of the wells and the past development of the formations without certain availability of the tight for-

mation incentive price. Under the procedures set out in § 271.703(c)(2)(i), no finding of incentive price necessity is required, unless the formation does not meet the permeability standard set out in § 271.703(c)(2)(i)(A) and the recommendation is filed under the alternative guidelines contained in § 271.703(c)(2)(ii). Where the formation meets all of the guidelines in § 271.703(c)(2)(i), the Commission has already made a generic finding, in Order No. 99, that the incentive price is necessary under NGPA section 107(b). The Commission will not use individual tight formation recommendations to reopen Order No. 99.

On September 9, 1983, MDU filed out of time additional comments concerning the instant dockets. While these comments need not be considered as they were late filed, the Commission has reviewed the comments and will address them. These comments reiterate MDU's position regarding flow data on Petroleum Information scout cards, geometric mean averaging, infill drilling and the need for incentive pricing. Previous discussion of these issues adequately addresses MDU's objections and these issues therefore will not be discussed further.

In its September 9th comments, MDU again suggested that the average permeability values obtained from core analysis testing be adjusted by a correction factor to obtain more accurate readings. MDU also contended that the cored intervals and the pressure build-up test intervals need not be identical to arrive at a valid correction factor. The Commission finds that this question need not be decided in this Order. The evidence shows that pressure build-up data is available from only three of the seven sands in the recommended formations and that core analysis data is available from six of the seven sands. On the basis of this evidence, we find it impossible to establish a reliable relationship between permeabilities derived from pressure build-up tests and core analysis tests. Accordingly, in this case we believe that it is appropriate to give greater weight to the core analysis

data, and since these permeabilities are below 0.1 millidarcy for all core samples, the Commission concludes that these formations satisfy the guidelines established in § 271.703(c)(2)(i)(A).

Finally, MDU, in its September 9th comments, questions the accuracy of adjustments of core permeability values derived in the laboratory in order to obtain permeability values which more accurately express actual "in-situ" characteristics. The method used here is a standard that has been accepted in previous tight formation orders.[1] The Commission believes that this method of adjustment to in-situ conditions is acceptable for the data submitted.

Based upon the above discussion and a review of the evidence submitted by BLM, the Commission finds that the record supports the assertion that the Frontier Formation, and the Muddy, Dakota and Lakota Formations, located in Fremont County, Wyoming, meet the guidelines contained in § 271.703(c)(2). The Commission adopts the BLM recommendation.

This amendment shall become effective November 7, 1983.

List of Subjects in 18 CFR Part 271

Natural gas, Incentive price, Tight formations.

(Department of Energy Organization Act, 42 U.S.C. 7101 *et seq.;* Natural Gas Policy Act of 1978, 15 U.S.C. 3301-3432; Administration Procedure Act, 5 U.S.C. 553)

In consideration of the foregoing, Part 271 of Subchapter H, Chapter I, *Code of Federal Regulations*, is amended as set forth below.

By the Commission.

Kenneth F. Plumb,
Secretary.

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[1] *See* Order No. 105, High Cost Gas Produced From Tight Formations, Docket No. RM79-76 (Texas-1) (October 24, 1980).

[¶ 61,175]

High-Cost Gas Produced from Tight Formations, Docket Nos. RM79-76-214, RM79-76-215, RM79-76-228, and RM79-76-229, (Wyoming-14 & 15)

Order No. 338-A; Order Denying Request for Rehearing and Petition to Reopen and Remand

(Issued November 6, 1985)

Before Commissioners: Raymond J. O'Connor, Chairman; A. G. Sousa and Charles G. Stalon.

Montana-Dakota Utilities Co. (MDU) seeks rehearing of Commission Order No. 338 [1] or, in the alternative, reopening of the record and remand of the subject matter of the order to the United States Department of Interior, Bureau of Land Management (BLM). For the reasons set forth below, the request for rehearing and petition to reopen and remand are denied.

Background

On October 7, 1983, the Commission issued Order No. 338, adopting the recommendation of BLM that the Frontier, Muddy, Dakota, and Lakota formations, located in Fremont County, Wyoming, be designated as tight formations pursuant to section 107(c)(5) of the Natural Gas Policy Act of 1978 (NGPA) and section 271.703 of the Commission's regulations. The Muddy, Dakota and Lakota formations are known collectively as the Dakota Group. BLM's recommendation was based on information supplied by ARCO Oil and Gas Company, a Division of Atlantic Richfield Company (ARCO). MDU filed timely comments with the Commission in opposition to

[1] Docket Nos. RM79-76-151 and 152 (Wyoming 14 & 15), 48 Fed. Reg. 46,268 (Oct. 12, 1983) [*FERC Statutes and Regulations* ¶ 30,505].

BLM's recommendation. The Commission adopted BLM's recommendation in Order No. 338. On November 7, 1983, MDU filed a timely resquest for rehearing and stay of the order [2] and on March 27, 1984, MDU filed a petition requesting the Commission to reopen the record and remand the proceeding to BLM.[3]

Notice of MDU's petition was published in the *Federal Register* on May 30, 1984 (49 Fed. Reg. 22,497). On June 5, 1984, MDU requested a public hearing. On June 4 and 8, 1984, the Wyoming Public Service Commission (Wyoming) and the South Dakota Public Utilities Commission (South Dakota) filed notices of intervention. Wyoming objected to the possibility of increased gas costs and therefore supported MDU's petition. South Dakota also supported MDU's petition to reopen and remand. On June 14, ARCO filed comments protesting MDU's petition to reopen and remand. MDU also filed comments in support of its own petition. By operation of Rule 214, Wyoming and South Dakota were granted intervenor status upon the filing of their notices. On September 14, the Shoshone Indian Tribe and the Arapahoe Indian Tribe of the Wind River Indian Reservation jointly filed a late motion to intervene in opposition to MDU's petition to reopen and remand. For good cause shown, the late filed motion to intervene is granted pursuant to Rule 214(d).

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[2] On December 2, 1983, the Commission issued an Order Granting Rehearing for Purposes of Further Consideration in Docket Nos. RM79-76-214 and RM79-76-215, 49 Fed. Reg. 55,437 (Dec. 13, 1983), solely for the purpose of affording further time to consider the issues raised in MDU's petition. No action was taken on MDU's request for a stay. MDU's request for a stay is denied by this order.

[3] MDU's request to reopen and remand was assigned Docket Nos. RM79-76-228 and 229.

Under applicable NGPA regulations,[4] it is the Commission's policy to designate as a tight formation any formation recommended by a jurisdictional agency if the Commission finds that substantial evidence in the record submitted by the jurisdictional agency shows that the average gas permeability, stabilized pre-stimulation natural gas flow rate, and the pre-stimulation crude oil flow rate of the formation do not exceed designated limits.[5] However, under section 271.703(c)(2)(i)(D) of the regulations, if all or part of the formation was authorized to be developed by infill drilling[6] prior to the date of recommendation, and if the jurisdictional agency has information indicating that the formation or portion thereof subject to infill drilling can be developed absent the incentive price, then the formation or portion thereof shall not be included in the recommendation.

In Order No. 338, the Commission determined that despite MDU's objections, the recommended formations met the permeability and gas flow rate guidelines set forth in section 271.703(c)(2)(i)(A) and (B) of the regulations and that there were no infill drilling authorizations applicable to any portion of any of the formations. Consequently, the Commission adopted BLM's recommendation. The Commission's findings with respect to permeability, natural gas flow rate, and infill drilling may be summarized as follows.

1. *Permeability.* Permeability may be tested by several methods, two of which are core analysis and pressure

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[4] 18 C.F.R. § 271.703(c) (1985).

[5] Oil flow rates are not at issue since the subject formations are not productive of crude oil.

[6] As defined in §271.703(b)(6), "infill drilling" means drilling in a substantially developed formation which is in excess of normal spacing requirements and which is permitted by the responsible state authority in order to provide more efficient and effective drainage of reservoirs in the formation.

build-up analysis. Extensive core analysis data were available for both the Frontier formation and the Dakota Group. A summary of core analysis data was derived by geometrically averaging multiple permeability values measured within the pay zones of eight well bores, covering both the Frontier formation and the Dakota Group.[7] ARCO then selected and submitted to BLM 23 geometrically derived permeability values representative of the subject formations. The 23 values were arithmetically averaged by the Commission to obtain the average formation permeability. Actual core analysis data were not submitted to BLM. Pressure build-up data for the Frontier formation and the Dakota Group were significantly less extensive than the core analysis data and were not utilized by BLM.

MDU argued that the core analysis data relied on by BLM should have been adjusted by a correction factor based on the omitted pressure build-up data. In Order No. 338, the Commission concluded that the intervals tested by pressure build-up analysis were not identical to those tested by core analysis, no reliable relationship existed between the analyses, and a correction factor therefore was not appropriate. The statistically more representative core analysis was relied on to assess permeability of both the Frontier formation and the Dakota Group. With respect to averaging methodologies, the Commission has never required that the permeability values in individual well bores be determined solely by arithmetic averaging. Hence, ARCO's method of geometrically averaging permeability values within the well bore is permissible.

2. *Natural Gas Flow Rate.* Section 271.703(c)(2)(i)(B) specifies maximum allowable production rates based on depth of formations. Drill stem data establish-

[7] The geometric mean average of a statistically diverse sample containing extreme high and low values will be lower than the arithmetic average of the same sample.

ing the stabilized pre-stimulation flow rate of the subject formations were submitted by ARCO demonstrating that the flow rates from these formations did not exceed the levels prescribed by section 271.703(c)(2)(i)(B) of the regulations. These data were accepted by BLM for purposes of its recommendation, and were adopted by the Commission in Order No. 338.

MDU argued that certain data concerning pre-stimulation flow rates which showed flow rates in excess of those permitted by the Commission's regulations were available to ARCO but were not submitted to BLM. In Order No. 338, the Commission concluded that the data referred to by MDU, available on Petroleum Information scout cards, were based on drill stem testing in which the stabilized flow rate had not been established, as is required by the Commission's regulations. Further, BLM has advised the Commission that it considers scout cards to be unreliable for the purpose of determining stabilized flow rates.[8] Consequently, the Commission declined to rely on the scout card data.

3. *Infill Drilling.* Jurisdictional agencies typically require that production wells be spaced on drilling units so that no more than one well per unit is producing gas from a given formation. Several wells may be drilled within the same surface unit without violating spacing rules provided the wells are producing gas from different formations. In accordance with local custom and practice, the number of gas wells in the recommended formations is limited to one well per 320 acre drilling unit.[9] In Order no. 338, the Commission rejected MDU's contention that infill drilling had occurred in the recommended for-

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[8] *See* letter dated May 19, 1983, from the Bureau of Land Management to the Federal Energy Regulatory Commission.

[9] There are no federal spacing rules *per se*. As a matter of common practice, however, BLM often follows state spacing requirements but does not technically subject its lessees to such requirements.

mations, thereby disqualifying them for designation as tight formations. The Commission recognized that the formations are located entirely within the Wind River Indian reservation and are therefore not subject to state infill drilling orders or infill drilling restrictions contained in the Commission's regulations. The Commission further recognized and adopted BLM's determination that the number of wells drilled into the formations did not exceed one well per 320-acre drilling unit. The Commission, therefore, concluded that no infill drilling had occurred in the recommended formations.

MDU's Arguments

Both MDU's request for rehearing and its petition to reopen and remand are based on MDU's assertion that ARCO should have been required to submit additional data to BLM in order to satisfy the substantial evidence requirement of section 506(a)(4) of the NGPA, and that different statistical methodologies should have been employed by BLM in determining the permeability of the formations in question. Specifically, MDU asserts that ARCO should have submitted actual core analysis data, rather than summary data, as well as all pressure build-up data, drill stem tests, and flow rate data available to ARCO. In its petition to reopen, MDU also argues that despite the non-existence of well spacing requirements affecting the subject acreage, the Commission must impute a well spacing requirement in order to determine whether the recommended area has been substantially developed for purposes of applying the infill drilling criterion contained in the Commission's regulations. Finally, MDU challenges the lack of record evidence supporting the need for an incentive price for development of the recommended formations, given the development history of the formations.

Discussion

Upon review of MDU's request for rehearing and petition to reopen, the Commission concludes that MDU's arguments are without merit and do not warrant modification of Order No. 338. MDU has presented no new facts or arguments with regard to the flow rate issue. This issue was fully considered in Order No. 338 and no further comment on this issue is necessary. However, MDU's arguments concerning the issues of permeability, infill drilling and the Commission policy of determining need for tight formation incentive pricing on a generic basis merit further consideration and comment.

MDU's argument that actual core analysis data, rather than a summary of the data, must be submitted to establish permeability values is rejected. The Commission does not require actual core analysis data to be submitted for the purpose of evaluating formation permeability and has approved numerous recommendations based on representative summary data. MDU has not demonstrated that the summary data relied on by BLM, and adopted by the Commisison in Order No. 338, are in any way unrepresentative of the permeability of the subject formations. The Commission reaffirms its conclusion that the summary data relied upon by BLM constitutes substantial evidence supporting the conclusion that the subject formations meet the permeability standards prescribed in section 271.703(c)(2)(i)(A) of the Commission's regulations.

With respect to the issue of infill drilling, MDU argues that the Commission's findings in Order No. 338 are in conflict with standards applied by the Commission in Order No. 148,[10] involving certain formations located in Colorado. MDU argues that in Order No. 148 the Commission found that portions of a recommended tight formation were substantially developed because of additional

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[10] 46 Fed. Reg. 29,699 (June 3, 1981) [*FERC Statutes and Regulations* ¶ 30,258].

drilling which took place prior to the date of the recommendation, and that such drilling constituted infill drilling within the meaning of the Commission's regulations. MDU argues that the Commission should determine whether portions of the Dakota Group and Frontier formation have been "substantially developed" as that term is described in Order No. 148.

In Order No. 148, the Commission found evidence indicating that certain areas within the recommended formation had been authorized to be developed by infill drilling prior to the date the tight formation recommendation was made and that certain drilling units within the area had been substantially developed by infill drilling without the incentive price. The Commission determined that 46 percent of thirteen drilling units contained three or more wells and 62 percent of those units contained two or more wells. Absent infill drilling authorization, only one well per drilling unit would have been permitted under applicable state spacing rules. Since the evidence showed that certain sections had been substantially developed by infill drilling, the Commission excluded those sections from designation as tight formations.

As previously noted, there are no well spacing rules applicable to the Dakota Group or Frontier formation due to their location on an Indian reservation. However, assuming that state spacing rules were applicable and that infill drilling had been authorized, the evidence demonstrates that no infill drilling had occurred at the time BLM's recommendation was made. Support for this conclusion is provided by information supplied by ARCO, accepted by BLM, and adopted by the Commission in Order No. 338, demonstrating that not more than one well per drilling unit had been completed in any of the subject formations as of the date of the recommendation.[11] Accordingly, application of the test set forth in

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[11] *See* BLM Docket No. W-353-2 and W-354-2, ARCO Exhibit Nos. 1 and 2. This fact is acknowledged by MDU in its comments

Order No. 148 to the facts of this case leads to the conclusion that the subject formations had not been substantially developed.

Finally, MDU renews its contention that the record lacks substantial evidence in support of the need for an incentive price given the production history of the subject acreage. In Order No. 99,[12] the Commission made a generic finding that an incentive price is necessary under NGPA section 107(b), and thus is available to producers of gas from tight formations under section 107(c), provided the formation meets the standards set forth in the regulations, and provided that the producer is authorized by contract to collect the incentive rate. The Commission reaffirms its prior conclusion on this issue and declines to attempt to determine the need for incentive prices in individual cases where the applicable generic standards are satisfied.

Conclusion

The Commission concludes that the recommendation of BLM, as adopted by the Commission in Order No. 338, is supported by substantial evidence. The issues raised by MDU were considered by the Commission in Order No. 338 and have been reconsidered in this order. MDU has presented no facts or principles of law which would warrant modifying Order No. 338, reopening the record, or remanding the proceeding to BLM. MDU's request for rehearing and its petition to reopen and remand are accordingly denied.

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filed on June 14, 1984. (MDU states only that the subject drilling units contain "at least" one well. It does not allege that any drilling unit contains more than one well Exhibit No. 2 of Appendix A to MDU's comments shows that, in fact, none of the drilling units contained more than one well as of the date of BLM's recommendation).

[12] 45 Fed. Reg. 56,034 (Aug. 22, 1980) [*FERC Statutes and Regulations* ¶ 30,183].

[¶ 30,183]

45 F. R. 56034 (August 22, 1980)

18 CFR Parts 271, 273, 274

[Docket No. RM79-76; Order No. 99]

Regulations Covering High-Cost Natural Gas Produced From Tight Formations

August 15, 1980.

AGENCY: Federal Energy Regulatory Commission, DOE.

ACTION: Final rule.

SUMMARY: Federal Energy Regulatory Commission pursuant to sections 107(b) and (c) of the NGPA hereby adopts regulations that establish an incentive maximum lawful price ceiling for certain natural gas produced from tight formations. The regulations also provide guidelines for formally designating tight formations and for determining which wells drilled into such formations will qualify for the incentive price.

EFFECTIVE DATE: September 22, 1980.

FOR FURTHER INFORMATION CONTACT:

June G. Perin, Office of the General Counsel, 825 North Capitol Street, NE., Room 8100-D, Washington, D.C. 20426, [202]357-8473.

Colette Bohatch, Office of the General Counsel, 825 North Capitol Street, NE., Room 8100-B, Washington, D.C. 20426, 202] 357-8140.

Webster Gray, Division of NGPA Compliance, Office of Pipeline and Producer Regulation, 825 North Capitol Street, NE., Room 6000, Washington, D.C. 20426, 202] 357-8682.

SUPPLEMENTARY INFORMATION:

I. Introduction

The Federal Energy Regulatory Commission (Commission) firmly supports the national policy to encourage production of natural gas from unconventional sources that can be put into production only at extraordinary risk or cost. One such source of gas is a fairly common geological feature known as a "tight formation" or "tight sand" that is described in detail below. By the final regulations promulgated in this order the Commission establishes an incentive price ceiling for certain natural gas produced from tight formations.

This rule implements the Congressional authorization to the Commission in section 107(b) of the Natural Gas Policy Act of 1978 (NGPA) (15 U.S.C. 3317), to set a "special price" which is "necessary to provide reasonable incentives for the production of * * * high-cost natural gas." In exercising this authority, the Commission has been concerned that any section 107 special price provide an incentive during the period before the NGPA deregulation beginning in 1985. The key question addressed by the Commission in this rulemaking is what incentive price best meets the statutory standard of a "necessary" incentive during the transitional period between issuance of this rule and 1985.

In addition to specifying an incentive price, the regulations also provide guidelines for formally designating tight formations and for determining which wells drilled into such formations will qualify for the incentive price. Under the rule, most new wells and recompleted wells

producing from designated tight formations will be eligible for the incentive price.

II. Background

A "tight formation" is a sedimentary layer of rock cemented together in a manner that greatly hinders the flow of any gas through the rock.[1] Because such a formation is characterized by low permeability, wells drilled into gas-bearing formations of this kind usually produce at very low rates.

To stimulate production from these formations, producers must use expensive enhanced recovery techniques. The technique usually applied to tight formations involves massive hydraulic fracturing, which creates a system of cracks permitting trapped gas to flow more easily into a wellbore.

It is estimated that between 200 and 700 trillion cubic feet (Tcf) of natural gas is trapped in tight formations within the United States. Depending upon the applicable price incentive, it is estimated that the gas recoverable in tight formation might equal the amount of proven domestic conventional gas reserves.

The estimated amount of tight formation gas includes formations that are presently being developed as well as formations that are known but undeveloped. This rule will provide an incentive price for production gas produced from several types of drilling programs: (1) Infill wells drilled into certain developed tight formations; (2) recompletion of wells that are already producing from formations vertically situated in relationship to the

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[1] One commenter was concerned that the Commission referred to "tight sands" in the preamble of the interim rule. Any use or reference "sands" in the interim rule or in this rule does not have the effect of limiting the applicability of the rule to "tight sands." The rule makes the incentive price available for all gas produced from qualifying tight formations.

designated tight formations; and (3) new wells drilled and completed in undeveloped tight formations. Most of the first gas to be produced from tight formations under this incentive program is likely to be gas produced through recompleted wells. Some of these wells can be brought into production without any additional drilling by completing existing wells in tight formations.

The Commission issued a Notice of Inquiry (Docket No. RM79-44, 44 FR 34969, June 18, 1979) regarding high-cost gas. The public response to the notice generally recommended that tight formation gas be considered for qualification as a high-cost gas. President Carter, in his energy address to the nation on July 16, 1979, also urged the Commission to set a price incentive for tight formation gas.

A Notice of Proposed Rulemaking was issued by the Commission on August 29, 1979 (Docket No. RM79-76, 44 FR 52255, September 7, 1979), proposing an incentive price ceiling for tight formation gas. Public hearings were held in Washington, D.C. on September 24th and in Denver, Colorado, on September 27th. Numerous written comments were received. The Commission encouraged State agencies that would be affected by these regulations to participate in the rulemaking process.

Interim regulations were developed from the proposed regulations taking into account the suggestions submitted during the public proceedings. The interim regulations were issued on February 20, 1980, along with newly proposed regulations for recompletion tight formation gas. The Commission requested comments on both the interim regulations and the proposed regulations.

The Commission has been persuaded by the final series of comments to adjust upward the incentive price ceiling for new tight formation gas, to incorporate an incentive price ceiling for recompletion tight formation gas, and to refine further the designation and well category determination procedures of the interim rule.

III. Summary of the Rule

A. Price

These regulations establish an incentive price ceiling for new and recompletion tight formation gas produced from designated tight formations (see § 271.703(b) (2) and (3)). The maximum lawful price for both categories is the effective negotiated contract price (see § 271.703(a)) between the buyer and seller or 200 percent of the maximum lawful price for section 103 gas, whichever is lower.

B. Negotiated Contract Price Requirement

The incentive price established in this rule is only a ceiling price. Once gas is found to qualify as new or recompletion tight formation gas, the seller can collect a price higher than the otherwise applicable maximum lawful price up to the ceiling if the contract contains an effective negotiated contract price.

As defined in § 271.702 of this rule an effective negotiated contract price is one that either is established by reference to the incentive pricing authority of the Commission under section 107 of the NGPA or is established by a fixed rate or fixed escalator clause, *i.e.* a clause that changes the price for the gas by a specified amount on a specified date.

C. Designation of Tight Formations

As provided in the interim rule, the price incentives in the final rule are available only for gas produced from tight formations that are designated in accordance with the procedures set forth in the rule. The designation procedure begins with the jurisdictional agency. The jurisdictional agency will establish procedures and conduct investigations to identify tight formations that meet the guidelines set forth in § 271.703(c). The jurisdictional

agency will then recommend to the Commission that specific formations or portions thereof be designated as tight formations.

The guidelines for identifying tight formations contain standards regarding permeability, gas productivity, and production of associated oil. In addition, if infill drilling had been approved for the formation prior to the date of recommendation, the guidelines require an exclusion for any portions of the formation for which an incentive price is not warranted.

1. *Permeability Standard.* The Commission has established a permeability limit of 0.1 millidarcy. Pursuant to this limitation the average permeability throughout the "pay" or gas-producing section of the recommended formation may not exceed 0.1 millidarcy. If the formation does not meet the 0.1 millidarcy permeability standard, the jurisdictional agency may still recommend the formation under the alternative guideline contained in § 271.703(c)(2)(ii). Under this guideline, the jurisdictional agency must make an adequate showing that the formation exhibits low permeability characteristics and must find that, due to extraordinary costs, the incentive price is necessary for production.

2. *Gas Productivity Standard.* The guidelines also impose a gas productivity standard. According to this standard production expected from the recommended formation, without stimulation, may not exceed a certain rate. The standard applicable to a given formation depends upon the average depth from the surface location to the top of the formation. The cost of drilling and completing gas wells increases exponentially with the depth of the well, so deeper wells must produce more to be economical. We have provided this productivity scale to allow a greater production rate for the deeper, more expensive wells.

3. *Associated Oil Productivity Standard.* A well in a designated tight formation may not be expected to pro-

duce more than five barrels of crude oil per day. The definition of crude oil includes only hydrocarbons that exist in the liquid phase in underground reservoirs and remain liquid at atmospheric pressure after passing through surface separating facilities. The five-barrel limit has been imposed because the value of oil in greater quantities should, by itself, provide the necessary incentive for the development of the formation, obviating the need for additional incentives.

4. *Infill Drilling Standard.* A guideline has been added in § 271.703(c)(2)(i)(D) concerning infill drilling that was authorized prior to the date of recommendation. Under this guideline the jurisdictional agency should exclude that portion of the formation it determines can be developed without the incentive price.

D. Recommendation and Designation of Tight Formations

Section 271.703(c)(3) of the rule also provides that a jurisdictional agency's recommendation must be accompanied by engineering, geological, geographic, and other information identifying the characteristics of the formation. Upon receipt of a recommendation the Commission will publish it in the Federal Register, will accept written comments on the recommendation, and will provide an opportunity for public hearing. After the comments have been reviewed, the Commission will prescribe a rule approving, disapproving, or modifying the recommendation. No modification will be made until the jurisdictional agency has been consulted. If the formation is approved, the Commission will list the qualifying formation in new § 271.703(d) of the regulations.

E. Well Determinations

Once a recommended formation has been approved by the Commission, a well category determination can be made regarding the eligibility of the gas as either new

tight formation gas or recompletion tight formation gas. To qualify for one of these categories, the gas must meet the definitional criteria set forth in the definitions of new or recompletion tight formation gas in § 271.703(b)(2) and (3), respectively.

Section 274.205 of the rule also provides two sets of filing requirements for well determinations: one for new tight formation gas and the other for recompletion tight formation gas. In the case of new gas, the requirements are designed to elicit the following information: first, whether such gas has been produced from a designated tight formation; second, whether the surface drilling of the well was begun on or after July 16, 1979; and third, whether the gas qualifies as new natural gas or is produced through a new onshore production well. In the case of recompletion gas, the application must show that the gas is produced from a designated tight formation through a well which was not completed for production from the designated tight formation before July 16, 1979.

IV. Comment Analysis

A. Price

Under § 271.702 of the interim rule, an incentive price ceiling of 150 percent of the section 103 price was available for "new tight formation gas," defined in § 271.703 as gas: (1) Which is new natural gas, or gas produced through a new onshore production well;

(2) Which is produced from a designated tight formation through a well the surface drilling of which began on or after July 16, 1979; and

(3) For the first sale of which a negotiated contract price is effective.

At the time the interim rule issued, the Commission proposed the following definition for tight formation gas produced through recompleted wells: (c) "Recompletion

tight formation gas" is natural gas: (1) Which is produced from a designated tight formation through a well, the surface drilling of which was begun before July 16, 1979, if such well was not completed for production from such formation before July 16, 1979; and

(2) For the first sale of which a negotiated contract price is effective, and proposed a maximum price as follows: (2) *Recompletion tight formation gas.* The maximum lawful price, per MMBtu, for recompletion tight formation gas shall be the lesser of: (i) The negotiated contract price; or

(ii) The maximum lawful price specified for the Subpart C of Part 271 in Table I of § 271.101(a) [section 103].

In this final rule, the Commission has increased the interim ceiling price for new tight formation gas and has also made the incentive price applicable to recompletion tight formation gas. Modifications to the above-quoted definitions were made and are described in a separate discussion below.

The ceiling price for new tight formation gas provided in the interim rule was considered by the Commission to be a substantial incentive at 150 percent of the section 103 price.[2] However, the Commission was open to suggestions recommending a higher incentive price but requested that such recommendations be supported by data.

The Commission's reluctance to adopt a higher price also reflected a concern that a higher price might create perverse incentives, that is, manpower and material resources would be shifted from the production of other types of gas to less productive but higher priced tight formation gas with the consequence being a decrease in

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[2] Regarding incentive prices, the Conference Report that the price need not be cost-justified. H. Rep. No. 95-1752, 95th Cong., 2d Sess., 88 (1978).

the nation's total production of natural gas. Because the interim record was punctuated with legal and practical questions, the Commission set a moderate interim price and invited further comment and submission of information on the need for a higher price.

The next round of comments submitted in response to the interim rule presented for the most part conclusions unsubstantiated with data or empirical information, even though the Commission strongly urged that such supporting information be submitted on the price issue. The Commission particularly requested that additional information be submitted to enable it to make the requisite statutory findings that a higher incentive price is "necessary to provide reasonable incentives." Despite this appeal, most of the commenters asserted without substantiating information that a higher price is necessary and that the price should be indexed to a commodity value of gas.

Commenters can be divided into three groups. Some suggested a commodity value based upon the marginal value of gas supplies such as imported gas. Others suggested a Btu-equivalent price based upon oil products with which gas would compete. The third but smaller group of commenters supported prices in line with the interim price.

Commenters filed on behalf of several members of the U.S. Senate, producers, and governmental agencies supported a Btu-equivalent price for new tight formation gas. Some suggested using decontrolled domestic oil, while others suggested imported oil. Utilizing an oil price as an index would probably require a ceiling price around 250 percent of the section 103 price as of August, 1980.

Others suggested pricing new tight formation gas at the border price of imported Mexican or Canadian gas, which is approximately 200 percent of the section 103 price as of August, 1980.

Numerous arguments were offered in support of the higher incentive price. Several commenters argued that production costs for gas from tight formations are approximately twice as high as production costs from conventional formations. The greater the cost of tight Formation production, they contended, is attributable to the massive hydraulic fracturing that is required to enable gas to flow at a producible rate to a wellbore.

Commenters stated that gas production from tight formations is also accompanied by a slow rate of production that extends the payback period to approximately twice what would be expected for a conventional well. The commenters contended that together, the increased costs and the extended payback period require the price of tight formation gas to be approximately four times greater than the price for conventional gas in order to provide an incentive for the development and production of tight formation gas.

A commodity price was further supported by the commenters' argument that tight formation reserves can be added to the nation's total gas reserve potential only if investment dollars are attracted to tight formation development. If the incentive price is high enough, investment dollars will be attracted to the development of tight formation gas reserves. The anticipated return on capital investment in a tight formation will be compared, however, to other investment opportunities. The commenters argued that energy investment dollars will not flow to tight formation development if the price for such gas is not, at least, comparable to the free market value of the gas.

Commenters argued that the statute permits a commodity value price if that price is necessary to provide reasonable incentives for production of high-cost gas. They also emphasize that the Conference Report suggests that the price need not be cost-based or require cost justi-

fication.[3] They argued that a cost comparison between tight formation drilling and conventional drilling indicates that tight formation gas must be priced at least twice as high as conventional gas to provide an incentive that exceeds the cost basis. It is asserted by these commenters that the Commission is free to boost the incentive to reflect a commodity value price for this gas if the Commission finds that the price will provide reasonable incentives.

Several Senators further argued that this statutory interpretation is supported by the legislative history. The House Ad Hoc Committee of Energy stated that the incentive price is extended to provide the "fullest practicable development" of our gas reserves.[4] This can be accomplished by extending a commodity value price so as to make development of tight formations competitive with other energy sources. In this way, tight formations can successfully compete with other energy sources for investment dollars.

The interim price was supported by Northwest Pipeline, the Public Service Commission of New York, and Southern California Gas Company. Texas Oil and Gas Company suggested a variation of the interim price, *i.e.* 150 percent of the otherwise applicable maximum lawful price, either the section 103 or 102 price. Professor Dorfman from the University of Texas and the Interstate Oil Compact Commission suggested a graduated price based on the depth of a well. Under this last approach a shallow well would qualify for a price approximately at the interim price but a deep well would qualify for a higher price approaching the Btu-equivalent price of oil.

Some commenters maintained that a higher price would result in a windfall to producers and not necessarily result in increased production from tight formations.

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[3] H. Rep. No. 95-1952, 95th Cong., 2d Sess. 88 (1978).

[4] H. Rep. No. 95-543 (Vol. I), 95 Cong., 1st Sess. 46 (1977).

They shared the concern about perverse incentives expressed by the Commission in the interim rule, that even if increased production from tight formations occurred, drilling rigs would be diverted from conventional wells to tight formations. They argued that because the drilling rig industry would be unable to meet the increase in the total demand for new rigs there would be less activity in other, more productive formations. Their conclusion was that the nation's total gas production would decline because of the shift of investment dollars and drilling activity from conventional sources to tight formations that have lower rates of productivity.

Commenters further argued that actual delivery of gas produced from tight formations would be deferred because of a lack of pipeline capacity to handle increased production from many tight formations.

On statutory grounds, these commenters argued that price treatment under section 107 does not warrant a Btu-equivalent or a commodity-value price. Indexing the price of tight formation gas to a commodity value effectively deregulates the price because the suggested commodities, imported oil, domestic decontrolled oil, and imported Canadian or Mexican gas, are free of price controls.

In support of this argument, the commenters stated that Congress' explicit deregulation of certain categories of gas, including for example high-cost gas, section 107 (c) (1) through (4), did not mean that other categories can or should be deregulated. Although the Commission was given discretion over determination of additional categories of high-cost gas under section 107(c)(5) and establishment of a ceiling price for these additional categories under section 107(b), they contended that the Commission does not have the authority to deregulate the price of such gas.

After these comments were received, the Commission held a hearing on June 10, 1980, to discuss the com-

menters' suggestions regarding the interim rule. This meeting provided an opportunity for a frank exchange between interested parties and the Commission regarding, among other issues, the price issue. Since the majority of participants at this hearing urged a price higher than the interim price, the discussion centered around the economic basis for a higher price and the policy that would be furthered by a higher price.

V. Price Analysis

The Commission is in a unique position in implementing section 107. Congress established a pricing scheme in Title I of the NGPA and mandated prices which it believed provided appropriate incentives for all categories of gas, except for categories of high-cost gas under section 107(c)(5). Thus, in sharp contrast to other categories of gas under the NGPA, Congress left unanswered the question of what incentive price should be set for high-cost gas and granted to the Commission the discretionary authority to establish the appropriate incentive price.

In establishing prices for high-cost gas, the Commission must be sensitive not to undermine Congress' overall pricing scheme. Section 107(c)(5) prices must not create perverse incentives but must be in harmony with the overall Congressional scheme.

In addition, the Commissioner must balance the competing interests of suppliers and consumers. On the supply side, gas producers must make long term resource commitments for the development of tight formations. It is in the nation's interest that they view development of tight formation gas as an attractive investment. The higher the incentive price, the more attractive it will be to develop this resource. The price should provide an incentive for producers to begin such development now. Absent this additional incentive, some producers may decide to defer production efforts until decontrol, which

begins in 1985. On the other hand, consumers should not be required to pay a price higher than the otherwise applicable NGPA price unless there is a reasonable basis for assuming that a higher price is necessary and will result in an increased supply of gas.

Keeping in mind the needs of producers and consumers, the focus of our pricing inquiry is to determine the necessary incentive for the transition period between now and 1985. It is our intention to establish a price that will stimulate production of gas from tight formations during the transition period.

The Commission has developed and applied two different approaches in determining the necessary and appropriate incentive price for this transition period. One approach is value-related, while the other is cost-related. The value-related approach attempts to index the price of tight formation gas to that of other energy forms. The cost-related approach looks instead to the costs and risks associated with tight formation gas production. Taken together, the two approaches define a range of reasonableness for the incentive price which would seem to be fully consistent with the statutory mandate.

A. Value-Related Price Approach

Congress, in enacting the NGPA, stated that natural gas prices should no longer be set on a utility-type, cost-based approach as had been the practice under the Natural Gas Act (NGA). In connection with this change from cost-based prices to incentive prices, Congress realized that the NGA prices discouraged producers from producing expensive, unconventional resources. The incentive prices established by Congress are not based upon a strict commodity-value concept because the NGPA price ceilings do not explicitly track any alternative fuel price. But it seems that the Congress intended a pricing scheme that related incentive prices to the price of competing fuels rather than just to the cost of producing gas.

Many commenters who urged a commodity-value approach for tight formation gas would have the Commission adopt an incentive price tied explicitly to the price of some other fuel. The fuels most commonly suggested were crude oil and fuel oil. These commenters concluded, on the basis of current prices, that the price for tight formation gas should be $6.00 or more.

The commodity value of gas is tied to end-user costs of competing or alternative fuels. The value of each additional unit of gas to the end user will depend upon the alternative fuel capability of that user. Over the near term (0-5 years), additional or "marginal" gas supplies will tend to be used in industrial or electric utility applications. For these uses, the principal competing fuel will be No. 6 (residual) or No. 2 (distillate) fuel oil. Few, if any, of these applications can be served by burning unrefined crude oil. So the appropriate basis for measuring the end-use market value of tight formation gas is fuel oil. Therefore, the Commission believes that a properly designed commodity-value approach must utilize fuel oil rather than crude oil as the point of reference.

The appropriate maximum lawful first sale (wellhead) price of tight formation gas can be derived using this approach by subtracting from the end-use market value of fuel oil the average cost of moving gas from wellhead to industrial and utility customers. It should be apparent that the comments of those who recommended a wellhead price for tight formation gas based on Btu equivalence with imported crude oil do not present a logically consistent model.

The Commission cannot adopt the suggestion to derive the first sale price ceiling of tight formation gas by reference to the price of imported fuel oil. There can be no assurance that these two prices would result in comparable values at the point of end use, which is the best transactional point for measuring value of fuel because no further value is added to the fuel when it is burned.

Having established that the preferred method of implementing a commodity-value approach is by reference to the price of fuel oil, the Commission must next decide which grade of fuel oil is most appropriate. Because the Commission seeks to establish a favorable incentive for tight formation gas, it has chosen to use No. 2 fuel oil, which is generally the more expensive.

The most recently available Btu-equivalent price based on the delivered price for No. 2 fuel oil to electric utility facilities was $5.78 [5] effective April, 1980 as reported by the Energy Information Agency (EIA).[6] Prices of No. 6 residual fuel oil were lower by $2.00 or more.

Using this Btu-equivalent delivered price, the imputed value of tight formation gas at the wellhead can be obtained by subtracting the average cost of transporting gas from the wellhead to the user. Transportation costs will vary depending primarily upon the distance of the industrial or utility user from the tight formation source. However, referring to the EIA's *Monthly Energy Review* for March, 1980, the average transportation and distribution costs for gas appear to be roughly $1.00 for industrial and utility customers. Reducing the Btu-equivalent delivered price, $5.78, by this $1.00 average transportation cost results in a "net back" wellhead value of equal to $4.78 for marginal supplies of gas. As measured by this method, we believe a price of around $4.78 reflects the upper bound on the wellhead value of gas to the economy for additional domestic production as defined by the commodity-value or the Btu-equivalent approach using No. 2

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[5] In quoting prices throughout the discussion of the price analysis, the Commission eliminated in most instances references to unit measures, of Mcf (thousand cubit feet) and MMBtu (million British thermal units). For the purpose of this discussion, the terms are interchangeable because an average Mcf contains approximately one MMBtu.

[6] The Energy Information Agency publishes monthly a report entitled Energy Data Report, FPC Form No. 423.

fuel oil as an index.[7] This price is sharply lower than the $6.00 price advocated by proponents of a simple imported crued oil equivalent price for tight formation gas.

Another commodity-value approach that the Commission considers to be of merit would relate the maximum lawful price for tight formation gas to the price of imported gas rather than to fuel oil. At present, the border price for Canadian and Mexican gas is $4.47.

B. Cost-Related Approaches

A "necessary" price within the meaning of the statute must at a minimum cover reasonable production costs and provide a reasonable profit. While the Commission need not establish a cost-justified price, estimates regarding the costs of production do provide one vital source of information for judging the adequacy of an incentive price. The Commission has considered two cost-related approaches, a supply-response approach, and a relative-costs approach that compares costs of tight formation production to the costs of other NGPA production.

1. *Supply-Response Approach.* At the time this rulemaking was initiated, the National Petroleum Council (NPC) had begun an extensive study of the resource base and production potential of domestic gas reserves in undeveloped tight formations.[8] The Commission has

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[7] The extensive record on incremental pricing developed in connection with the Commission's Title II implementation activities forcefully suggests that high sulfur residual fuel oil should be used to define a community value. However, because the Btu-equivalent price for No. 6 oil is now in the range of $2.50 to $3.75 even before subtracting $1.00 of transportation charges, the Commission is of the opinion that despite the logic and strong record linking the gas produced from tight formations to residual fuel oil, indexing the prices for tight formation gas to this fuel would not provide adequate incentive.

[8] The National Petroleum Council is a Federal advisory committee to the Secretary of Energy. The sole purpose of the NPC

analyzed the NPC data to estimate potential supply responses to price increases.[9]

The available NPC data indicate that prices higher than the otherwise applicable maximum lawful prices under sections 102 or 103 of the NGPA will produce increases in supply. A significant supply response occurs in the $3.50-$4.00 price range. Beyond this range, however, additional increases in price produced smaller increases in supply. Analysis of the NPC data also indicates that beyond the $3.50-$4.00 price range, the effective cost of the additional supply response may be as high at $7.54. Therefore, the NPC data would support a price of $4.00 on the basis of economically efficient increases in supply.[10]

2. *Relative-Incentive Approach.* A second cost-related approach would relate the ceiling price for tight formation gas to the prices Congress established in the NGPA to provide incentives for developing conventional gas. The measure of a necessary price for high-cost gas under this approach would be derived from consideration of the

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is to advise, inform, and make recommendations to the Secretary of Energy on any matter requested by the Secretary relating to petroleum or the petroleum industry. The Commission encouraged its staff to contact the NPC regarding an exchange of information which the NPC has collected on this topic.

[9] A subsidiary problem is to estimate the time pattern of response. To know that eventually the response to a price of X dollars will be Y Tcf's is of only limited assistance if the price of X dollars will be in effect for only a few years and then a different and deregulated price will apply.

[10] Commission staff noted that the NPC estimates were based on certain assumptions regarding the availability of capital, manpower, equipment, and pipeline capacity. Staff believes that the NPC assumptions were somewhat optimistic and that these factors will actually restrain the supply-response. However, staff was not able to quantify the effect these factors would have on the supply response and therefore did not account for them in their supply-response analysis.

relative cost, yield, and risk of production from tight formations as compared with conventional gas production.

Relative Cost. Several commenters argued without providing substantiating data that the average total cost of drilling and completing a tight formation well is roughly twice as great as the cost of bringing a comparably deep conventional well into production. This is because the cost of fracturing can be as great as the cost of drilling a well. All other things being equal, this means that a producer will require an incentive price at least twice as high for tight formation production as for conventional production in order for the expected financial return from the two production categories to be equal.

Clearly, this two-fold ratio will not hold for every tight formation well. Some production has a sufficiently low relative cost that it enjoys a positive incentive relative to current conventional development opportunities even at existing NGPA prices. But, on the average, if the relative cost of tight formation drilling is higher, then logic implies that such gas should be afforded a relatively high incentive price for production from this source to be a comparably attractive investment.

Relative Yields. A second prong of this approach is to examine the relative yields of tight formation wells compared to conventional wells. This is more difficult to analyze because upon fracturing, the production rate of a tight formation well may be comparable to or even exceed production from a conventional well during its first year or two. After that point in time, however, production usually falls off dramatically and continues at a relatively low rate for 15 to 20 years or more. In contrast, production rates of conventional wells tend to be relatively high for a period typically between 5 to 7 years, but then drop off dramatically. In that 5 to 7 year period a conventional well typically will have produced as

much gas as the tight formation well will produce over its 15 to 20 year life.

Commenters argued that the discounted present value of the revenues expected from tight formation wells tends to be much lower than the discounted present value of the revenues expected from wells drilled in conventional formations. However, it is difficult to define and to quantify "typical" production profiles for tight formation wells and conventional wells, making it impossible to consider lower yields, by themselves, a basis for a higher tight formation gas incentive price.

Relative Risks. The third step in determining a price using the relative incentive approach is to examine relative risks of production. Section 107(c)(5) refers to production "under such conditions as the Commission determines to present extraordinary *risks* or costs" (emphasis added). The record identifies two types of risks involved in tight formation gas production. One is the normal drilling risk of failing to find a gas bearing formation. The second risk especially pertinent to tight formation development is that of a partially or totally unsuccessful fracturing job. This second element of risk exposure provides a basis for arguing that tight formation production is more risky than conventional gas production. Neither the record nor staff's analysis has yielded an acceptable quantitative estimate of the extent to which the risk exposure of tight formation drilling exceeds conventional activities.

In summary, a "necessary" price can be viewed as the price necessary to create an equal or positive relative incentive for typical conventional drilling. Other NGPA categories, especially sections 102 and 103, provide a new incentive environment to producers. The premise underlying the relative incentive approach is that the price under section 107(c)(5) must be necessary to create a "reasonable" incentive in comparison with other NGPA categories. The record indicates that the Commission can

reasonably determine that the combined factors of risk, cost, and yield warrant a relative incentive price for tight formation gas that is at least twice as high as would otherwise be available under Title I (generally the NGPA section 103 or 102 price). This two-fold ratio would indicate a current price of about $4.50 in the case of section 103 (development) wells and about $5.00 in the case of section 102 (new gas).

C. Conclusion—Price Issue

Applied collectively to the information gathered on the record in this proceeding, the value-related and cost-related approaches yield a $3.50-$5.00 zone of prices that can be considered reasonably necessary to create an incentive for tight formation gas production.

As a basis for narrowing this range, the Commission acknowledges that the cost of producing tight formation gas will vary considerably among formations and among specific drilling projects. Virtually any incentive ceiling price that the Commission establishes for tight formation gas will provide a more than ample return on some wells and an insufficient return on other wells. Indeed, the same can be said of the present NGPA ceiling prices for which new tight formation production would otherwise qualify. If the Commission chooses the low end of the $3.50 to $5.00 range, its action would tend to minimize any unnecessary windfalls associated with this rulemaking. On the other hand, a low price will operate to discourage producers from drilling more difficult formations and could retard the development of costly, but promising, fracturing and recovery techniques.

The Commission seeks to resolve this difficult issue in favor of providing as great a production incentive as can be supported by both cost-related and commodity-value concepts. From the standpoint of energy policy, economic policy, and environmental policy, enhanced production of natural gas is in the nation's interest. On the basis of

these policy considerations, the Commission rejects the low end of the $3.50 to $5.00 range because it seeks to create a truly favorable drilling environment for tight formation producers.

On the other hand, the Commission rejects the high end of the price range (above $4.78) on the ground that such prices are not supported by assessments of the commodity value of marginal gas supplies. In seeking to provide a high price, but one capable of being supported by both commodity-related and cost-related concepts, the Commission is drawn to the $4.50 to $4.78 range.

A final policy consideration for selecting a specific ceiling price for tight formation gas focuses on the price of imported natural gas, the fuel most likely to be directly displaced by increased tight formation production. On policy grounds, a strong argument can be made that domestic producers of high-cost gas should be permitted to receive at least the $4.47 border price paid by U.S. pipelines for imported gas.

The Commission hereby adopts a price ceiling for tight formation gas at 200 percent of the NGPA section 103 price. For the month of August, 1980, the maximum price is $4.548. Future tight formation gas prices will escalate each month as the section 103 price escalates. For September and October, 1980, the maximum price of tight formation gas will be $4.586 and $4.624, respectively. Maximum prices for subsequent months will be included in the Commission's quarterly ceiling price publications.

A final point of emphasis on the issue of prices for tight formation gas is that the Commission by this rule is establishing ceiling prices only. A producer of tight formation gas does not have authority to charge these ceiling prices unless the producer has the requisite contractual authority. If the contract entered by the producer and the purchaser includes a negotiated contract

price as described in this rule, the producer can collect the contract price even if it exceeds the otherwise applicable NGPA price, but the producer cannot collect a price which exceeds the ceiling price established by this rule. The concept of negotiated contract price is discussed more extensively below.

D. Recompletion Tight Formation Gas

At the time the interim rule was issued, the Commission proposed establishing an incentive price for gas produced from existing wells which were not completed for production in a designated tight formation before July 16, 1979. The proposed incentive price for such gas was the section 103 price.

Most commenters agreed that gas produced from recompleted wells should qualify for an incentive on par with the price afforded new tight formation gas. The commenters generally justified their recommendation on the basis that costs of producing from a recompleted well are comparable to costs of producing from a new well (even though drilling costs are lower or are not incurred at all) because a producer would still incur the completion costs that represent a significant portion of the cost of production from a tight formation.

Another factor that argues in favor of an increased incentive price is that recompletion gas is the most readily accessible tight formation gas. The Commission's goal is to encourage producers to employ the most cost efficient and least time consuming programs for recovering tight formation gas. A price discrepancy between new gas and recompletion gas may cause producers to embark upon new well drilling programs with a lag time up to 3 years from inception to delivery in order to receive the higher incentive price for new gas rather than institute more cost-efficient recompletion programs.

To encourage producers to bring tight formation gas into production as soon as possible, the Commission is,

therefore, establishing the same incentive price for both categories of gas. The maximum lawful price for recompletion tight formation gas under the final rule is 200 percent of the section 103 price.

E. Other Considerations

The price set in the interim rule at 150 percent of the section 103 price was significantly grounded on a concern that a higher price would create perverse incentives that could result in less, rather than more gas supply on a national basis. A key concern was the predicted inability of the drilling rig industry to meet the increased demand for rigs to drill in tight formations while meeting the demand for rigs for other conventional formations. The NPC study has concluded and has convinced the Commission that the drilling rig industry has the capability to respond to likely increased demand that may result from this rule. If recompletion tight formation gas is the first to be placed into production, we believe this rule, in the short run, will place a smaller demand on the drilling rig industry than originally predicted.

Similarly, we find the arguments that have been raised regarding the adequacy of currently available pipeline capacity near tight formations to be a minor matter. Customarily, arrangements regarding transportation are made in advance of gas production. In the case of tight formation development, such large capital investments must be committed that it is reasonable to assume that a producer will negotiate with a pipeline for capacity long before the gas begins to flow. We believe that pipelines will make every effort to provide transportation capacity to satisfy the needs of the production industry.

A third concern, not ascribed to by many commenters, is the potential inadequacy of capital to invest in tight formation development. We cannot predict how much capital will be available in the future for tight formation development. It is reasonable however to expect

that a good investment will attract capital regardless of the economic environment. If tight formation gas is priced appropriately high, such development will successfully compete for investment capital.

F. Negotiated Contract Price

The negotiated contract price requirement appeared in the interim rule definition of "new tight formation gas" and the proposed definition of "recompletion tight formation gas." The negotiated contract price requirement was also reflected in the maximum lawful prices for new and recompletion tight formation gas.

The interim definitions of "negotiated contract price" and "fixed rate or fixed escalator clause" have been adopted in the final rule. Thus, as defined in § 271.702 (a) (1) the term "negotiated contract price" means any price established by a contract which either references the incentive pricing authority of the Commission under section 107 of the NGPA or contains a fixed rate or fixed escalator clause. Fixed rate or fixed escalator clause defined in § 271.702 (a) (2) means a provision in a contract for the first sale of natural gas which changes the price for gas by a specified amount on a specified date.

In the interim rule, the Commission stated that negotiated contract requirement was added to insure that the incentive maximum lawful price is extended as an *incentive* for the production of additional new tight formation gas, rather than as a windfall to the sellers. The same rationale would apply to recompleted tight formation gas. The Commission noted that contracts which do not presently contain a negotiated contract price may be amended to permit collection of the incentive price. In addition the Commission clarified that the negotiated contract price requirement in no way constitutes an interpretation of an area rate clause.

The overwhelming majority of comments opposed the negotiated contract requirement on legal and policy

grounds and urged that it be deleted. Many comments stated that the Commission is without authority under the NGPA or NGA to require that specific contract language be employed as a condition precedent to collecting the maximum lawful price. The comments asserted that the statutory scheme of the NGPA and the NGA in view of the *Mobile Sierra* [11] line of cases grants parties to gas sales contracts an absolute right to pay or to collect any price they may agree upon, subject only to price ceilings lawfully imposed by a governmental authority. In particular, paragraphs 101(b)(5) and (9) of the NGPA permit parties to sell gas at the applicable highest maximum lawful price not in excess of the contract price. It is argued that the Commission lacks authority to impose a requirement that contracts be renegotiated before the maximum lawful price can be collected.

Certain commenters asserted that contracts entered into post-NGPA, specifically reference the NGPA in order to permit the collection of higher prices and that the requirement to specifically reference section 107 could not possibly have been foreseen. Therefore, it is claimed that the rule operates unfairly to preclude sellers, who renegotiated their contracts in contemplation of NGPA prices and who undertook development of tight formations in anticipation of the Commission's action, from collecting the incentive price.

Under section 107, it is contended that the Commission's authority goes to establishing tight formation gas as high-cost natural gas and establishing an incentive price for its development and production. While it is agreed that the Commission has the discretion to establish the parameters for classification, it is submitted that the Commission does not have the authority to condition a well determination upon the presence of specific con-

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[11] *United Gas Pipeline Company v. Mobile Gas Service Corporation*, 350 U.S. 332 (1956); *FPC v. Sierra-Pacific Power Company*, 350 U.S. 348 (1956).

tract language. Rather, it is claimed that the NGPA provides that once an incentive price is established the producer must have contractual authority to collect the price (a contract that references the NGPA established price is sufficient to permit collection of the incentive price).

In addition, it is submitted that if the Commission's purpose in issuing this rule is to encourage the development and production of tight formation gas the negotiated contract requirement will not advance this purpose.

Still other commenters submitted that market forces will operate to set prices at an appropriate level only for those tight formations yet to be developed. It is asserted that most tight formations are already identified and are located near conventional gas which is already being produced or is dedicated to pipelines. For these reasons, it is argued that the negotiated contract requirement will place pipelines in superior bargaining positions and they will either refuse to renegotiate contracts up to the incentive price or will require additional consideration. In both cases the requirement will operate as a disincentive to production.

This argument led some commenters to request that purchasers be precluded from demanding additional consideration for existing contracts. If a purchaser refuses to amend his contract he should be required to release the seller from existing contractual obligations. It is also proposed that the Commission should permit producers to file petitions for exceptional relief in circumstances in which the pipeline is being arbitrary and capricious in not offering the required amendment, and in which the producer petitioner can demonstrate that the full incentive price is necessary for further development and production of tight formation gas.

The Commission reaffirms the position taken in the interim rule that it must limit the availability of the

incentive price ceiling to those contracts which specifically refer to it (or to the extent permitted under a fixed rate or fixed escalator clause) because its pricing authority is limited to setting incentive prices "necessary" to encourage additional production. Therefore, the negotiated contract price requirement has been retained in § 271.703(a) of the final rule which sets forth the maximum lawful price for both categories of tight formation gas. However, the Commission agrees that an effective negotiated contract price is not a necessary incident to obtaining a well determination and has deleted the requirement from the definitions of new and recompletion tight formation gas.

The Commission believes that the price ceiling if applied to all tight formation gas may operate as a windfall to sellers rather than an incentive to increase production of tight formation gas. This occurs in any case in which one incentive price is established to cover a broad range of production costs and risks. This is especially true where both parties to the contract did not contemplate the availability of an incentive price. The Commission believes that the imposition of the negotiated contract price requirement is therefore necessary to insure that a purchaser is given an opportunity to bargain for increased production of tight formation gas before he agrees to pay a price higher than the otherwise applicable maximum lawful price. In this regard, the negotiated contract price requirement will operate as part of the ceiling price which the Commission is establishing under section 107(b). Thus, in the Commission's view a "necessary" price for tight formation gas is one that is contractually agreed upon either at or below the ceiling price.

The statutory scheme of the NGPA or the NGA and the *Mobile-Sierra* line of cases do not compel a different conclusion. As we stated in the interim rule, parties to gas sales contracts are free to enter into or amend their

contracts to permit the collection of the incentive maximum lawful price. Existing contracts that specifically reference the Commission's incentive pricing authority under section 107 of the NGPA or that contain fixed rate or fixed escalator clauses are sufficient to permit collection of any price up to the ceiling price of 200 percent of the 103 price.

VI. Definitions for New and Recompletion Tight Formation Gas

Under § 271.703(b)(1) of the interim rule, gas qualifies as

> new tight formation gas" is natural gas: (1) Which is either new natural gas or gas produced through a new onshore production well; (2) which is produced from a designated tight formation through a well the surface drilling of which began on or after July 16, 1979; and (3) for the first sale of which a negotiated contract price is effective.

In addition, the Commission requested comments on the proposed definition of "recompletion tight formation gas." Under this proposal, gas qualifies as

> recompletion tight formation gas" is natural gas: (1) Which is produced from a designated tight formation through a well the surface drilling of which was begun on or before July 16, 1979, if such well was not completed for production from such formation before July 16, 1979; and (2) for the first sale of which a negotiated contract price is effective.

A. Negotiated Contract Price

As stated in the previous section, the negotiated contract price requirement has been deleted from the definitions of new and recompletion tight formation gas, but has been retained in § 271.703 that establishes the maximum lawful price.

B. Spud Date

Only a few comments discussed the requirement that to qualify as new tight formation gas, the gas had to be produced from a well the surface drilling of which began on or after July 16, 1979. One comment suggested that the spud date should be changed to "the date before which a well was not being commercially produced."

Another commenter suggested that February 19, 1977, be adopted as the spud date, for both categories of gas, since it is the pivotal date in the wellhead pricing scheme under the NGPA. This commenter argued that producers who commenced drilling into tight formations prior to July 16, 1979, did so with the expectation that the Commission adopt the suggestion in the Conference Report that gas produced from tight formations should be eligible for incentive price treatment.

Comments of a similar nature were made prior to the adoption of the interim rule. The first suggestion that the cut-off date apply to the date on which gas was first commercially produced from the well has been at least partially accommodated since the incentive price is now available for recompletion gas. In effect, so long as the well was not completed for production in the tight formation prior to July 16, 1979, the gas may qualify for the incentive price. The date of July 16, 1979, (as a spud date) was chosen in the interim rule in recognition of the fact that this rule was undertaken to give effect to a policy initiated by the President's July 16, 1979, speech. This date then, is consistent with the Conference Report, at page 88, which indicates that the pivotal date for section 107(c)(5) gas is the date the Commission exercises its authority under section 107(c)(5). The Commission is not free to make available special prices for gas whose development was encouraged by previously available prices. Therefore, July 16, 1979, will remain as a spud date for new tight formation gas, and as a completion date, for recompletion tight formation gas.

C. Conclusion

The definitions of new and recompletion tight formation gas appear in § 271.703(b)(2) and (3) of the rule. Gas qualifies as new tight formation gas if it is produced from a designated tight formation through a well which was spudded on or after July 16, 1979, and it is either new natural gas (as defined in section 102(c) or (d) of the NGPA), or gas produced through a new onshore production well, (as defined in section 103(c)). To qualify as recompletion tight formation gas, the natural gas must be produced from a designated tight formation through a well which was spudded before July 16, 1979, but not completed for production from such formation before July 16, 1979.

VII. Procedure for Designating Tight Formations

The procedure for designating tight formations was contained in § 271.705 of the interim rule. That section set forth guidelines for identifying tight formations and established procedures whereby a jurisdictional agency may recommend the designation of a tight formation. Upon the receipt of a jurisdictional agency recommendation, the Commission will publish it in the Federal Register and will accept comments on the recommendation. After a review of the comments the Commission will prescribe a rule approving or disapproving the designation of the recommended tight formation.

Several comments and proposals concerning the designation procedure in general were received. Some commenters urged the Commission to "predesignate" or at a minimum to take the lead in designating formations that have been studied by the Department of Energy (DOE) and the United States Geological Survey (USGS). Another suggestion was that there be automatic approval of jurisdictional agency or the USGS recommendations that meet the permeability, gas productivity, and crude oil production guidelines, reserving for Commission action recommendations made under

the alternate permeability guidelines. Other commenters stated that the jurisdictional agency process combined with the Commission process will be lengthy, unnecessarily burdensome and will cause a substantial delay in the production of gas from tight formations. These commenters suggest that the time periods and standard of review set forth in section 503(a) and (b) be utilized.

The Commission is not persuaded that a modification to the designation procedure is warranted. As stated in the interim rule the Commission does not have the information needed to accurately identify qualifying tight formations.[12] The interim rule's designation procedure was established to enable the Commission to fully utilize the information and expertise available to jurisdictional agencies and to thereby *prevent* undue delay in the identification of tight formations. To the extent that other Federal agencies have studied certain tight formations, we expect this information will be available to jurisdictional agencies and will facilitate the jurisdictional agency process.

Still another commenter submitted that there are not enough procedural safeguards in the interim rule. The rule does not provide producers an opportunity to seek review of a jurisdictional agency's refusal to make a recommendation. Commenters suggested a procedure to allow review in such a case.

Jurisdictional agencies are not obligated to recommend tight formations. The Commission believes the review procedure suggested is unnecessary and would constitute an unwarranted intrusion into the state jurisdictional agency process.

Proposals respecting interim collection authority were also received. One commenter urged that producers be

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[12] The Commission adopted this procedure in response to comments which suggested that the Commission should rely on the jurisdictional agencies' information and expertise in designing tight formations.

permitted to make interim collections prior to designation of a formation after it has submitted information and certified to the jurisdictional agency that the formation meets the criteria set forth in the guidelines. Pursuant to this proposal, interim collections would be allowed pending jurisdictional agency designation recommendation and final Commission approval. Another comment requested clarification of whether interim collection authority will be permitted prior to designation of the formation upon filing of an application for a well determination.

As discussed above, the procedure in the final rule provides for the expeditious designation of tight formations. The Commission believes that interim collection of the incentive price prior to designation of the formation is inappropriate. However, the Commission in § 273.204 has provided for retroactive collection for gas produced from qualifying wells in designated tight formations.

VIII. Guidelines

The interim rule provided that the Commission would approve the designation of any formation recommended by a jurisdictional agency if it met the three guidelines relating to permeability, gas production, and oil production. Certain of the comments were directed to these guidelines. The Commission has added a guideline that will be discussed below concerning formations or portions thereof which have been authorized to be developed by infill drilling programs.

The interim rule also provided that if a formation met the gas productivity and oil production guidelines but did not meet the permeability standard, then the Commission would consider the recommendation if the jurisdictional agency made an adequate showing that the formation exhibited low permeability characteristics and that an incentive price would be necessary. No comments

specifically addressed this provision, and it has been adopted without change in § 271.703(c)(2)(ii) of the final rule.

A. Permeability Standard

The interim rule required that the estimated *in situ* gas permeability, throughout the pay section be 0.1 millidarcy or less. A few commenters suggested that this standard is still unduly restrictive and will disqualify many formations that should be considered "tight." Higher standards ranging from 0.15 millidarcy to 0.5 millidarcy were suggested.[13]

Several arguments were presented in support of a greater permeability threshold. First, average permeability depends on the number of wells drilled and their location in the formation. Since most tight formations have not been developed extensively, the average permeability of a small number of wells would probably not be representative of the formation as a whole. Thus, the amount of necessary preliminary drilling and the greater expense and time involved in *in situ* permeability testing requires a millidarcy standard that is flexible enough to warrant the increased costs.

Some comments urged that the permeability standard be eliminated. One commenter asserted that a permeability determination of 0.1 millidarcy requires an expensive drawn down and build up test. It was proposed that a 30-day flow test based upon the depth criteria set forth in the interim rule be the sole factor in determining if a zone is tight.

Another alternative presented was that the designation by the jurisdictional agency should be based solely on production rates from newly drilled wells that had been

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[13] The NPC study and "various DOE reports" are cited for the proposition that a formation may be "tight" if it has a permeability of 1.0 millidarcy

tested in accordance with the procedures set forth by the United States Bureau of Mines Monograph No. 7. This commenter stated that the gas productivity standard should be retained until such time as information based on the testing of actual wells indicates that a revision would be appropriate.

The Commission remains cognizant of the difficulties inherent in adopting a permeability guideline. However, the objective of the rule is to identify and provide incentives for the development of tight formations, not to provide incentives to develop all formations with low prestimulation production rates. The Commission still believes that the problem presented by formations of extremely variable characteristics is not present in many tight formations and that estimates of average permeability may reasonably represent the permeability that will be encountered from one location to the next. However, if the average permeability cannot be reasonably estimated or if the average permeability does not fall within the 0.1 millidarcy guideline, then under the alternate guideline the formation may still be recommended for designation if the jurisdictional agency makes an adequate showing that the incentive price is necessary for production of gas from the formation because the formation is high-risk and high-cost and has low permeability characteristics.

B. Gas Production Standard

The interim rule set forth maximum allowable production rates. One commenter suggested that the gas productivity standard should only be applied to formations from zero to two thousand feet in depth since the costs of drilling and completing deeper wells multiply at a rate disproportionate to those for shallower drilling. If the standards for deeper wells are retained, the commenter urged a 35 percent higher price.

A similar argument was made that the straight payout of original drilling, completion, and equipping costs over a more feasible period than is indicated by the present gas productivity standard would be more appropriate for these high-risk ventures. The commenter proposed that in the event a Btu-equivalent price is not allowed, then the maximum allowable production rate should be increased.

The Commission believes that the higher incentive maximum lawful price provided in this rule will be adequate to cover the increased costs of equipping and completing deeper wells. Therefore, a revision to the gas productivity formula is unnecessary.

C. Production of Crude Oil

The interim rule provided that no well drilled into the recommended tight formation should be expected to produce more than five barrels of crude oil per day. This requirement was added to ensure that the gas is not produced with any more than a *de minimus* amount of oil. The production of more than five barrels of oil per day would, in itself, create an incentive for the development of the formation. One commenter claims that this limitation is unclear since "oil" is undefined and questioned whether it would include "condensate" from gas wells.

The interim rule and § 271.702(a)(3) of the final rule refers to the definition of "crude oil" contained in § 270.102(b)(5) of our regulations. Thus, as defined, crude oil includes any mixtures of hydrocarbons that are liquid in underground formations and remain liquid at atmospheric pressure.

Another commenter suggested that this guideline should be modified to provide that:

> * * * no well drilled into the recommended tight formation is expected to produce, *without stimulation*, more than five barrels of crude oil per day . . .

The commenter asserted that the addition of the phrase "without stimulation" appears in the gas productivity standard and should be tracked here to remove any ambiguity. We agree. Section 271.703(c)(2)(i)(C) has been so modified in the final rule.

D. Infill Drilling

In the preamble to the interim rule, the Commission stated that its objective in establishing the incentive program—

> Consist[s] of identifying and including tight formations that could not be commercially developed absent application of enhanced production techniques, and excluding the types of development activities that could occur under the otherwise applicable maximum lawful prices. (*mimeo* at p. 24).

The Commission did not adopt any of the several alternatives considered which would have mechanically excluded infill or developed portions of an otherwise tight formation. The Commission chose instead to rely on the skill and judgment of the jurisdictional agencies to identify and exclude the portions of a formation which would otherwise qualify as a tight formation but which could be developed without the incentive price. The following guidance was provided to jurisdictional agencies:

> While new infill wells are not excluded from qualification under this rule, jurisdictional agencies should be sensitive to the fact that some portions of tight formations have been developed to such an extent as to indicate that the incentive maximum lawful price is not necessary to encourage full production of that portion of the formation. If the agency has information which indicates such portions can be developed without the incentive price, such portions should be excluded from the jurisdictional agency's recommendation (*mimeo* at p. 27).

Subsequent to the adoption of the interim rule, it has come to the Commission's attention that there is some uncertainty regarding the appropriateness of recommending formations or portions of formations that are currently being developed by infill drilling programs. To clarify this uncertainty and to give effect to the policy enunciated in the interim rule, the Commission has added a new guideline, at § 271.703(c)(2)(i)(D). Under this guideline, if a formation or portion thereof was authorized to be developed by an infill drilling program prior to the date of recommendations and the jurisdictional agency has information which in its judgment indicates that such formation or portion subject to infill drilling can be further developed without the incentive price established in § 271.703(a), then the jurisdictional agency may not include such formation or portion thereof in its recommendation.

Two aspects of this guideline warrant clarification. The guideline has been added to focus jurisdictional agency attention on only those formations (or portions thereof) where development by infill drilling has been authorized *prior* to the date of recommendation. In this situation development of such formation may have been economical at previously available prices and therefore may indicate that the full development could occur absent the incentive price. If information available to the jurisdictional agency indicates that this is the case, it should not recommend the formation or should exclude that portion of the formation from its recommendation. Second, it should be emphasized that once a formation has been approved by the Commission as a designated tight formation, future infill wells will be eligible to receive the incentive price.

A definition of "infill drilling" has been added in § 271.703(b)(6). As defined, "infill drilling" means any drilling that occurs in a substantially developed formation or portion thereof that is subject to requirements

respecting well-spacing or proration units which were amended by the jurisdictional agency after the formation or portion thereof was substantially developed and which were adopted for the purpose of promoting more effective and efficient drainage of the reservoirs in such formation. Such amendment may provide for the establishment of smaller drilling or production units or may permit the drilling of additional wells on the original units.

The Commission wishes to emphasize that the infill drilling must have taken place in a substantially developed formation or portion of a formation *after* a jurisdictional agency amendment to well-spacing or proration unit requirements. In some situations, field or spacing rules are in effect and applicable to undeveloped portions of a field and these rules are amended prior to substantial development in order to permit the drilling of wells at closer spacing than permitted by the original rules. Where the original units had not been drilled prior to the creation of the smaller units or prior to the adoption of amended rules which permit the drilling of an additional well on the original unit, drilling in such circumstances would not be covered under this definition.

IX. Contents of Recommendations

The interim rule prescribed information that is required to accompany the jurisdictional agency's recommendation that a formation be designated as a tight formation. The comments criticized the requirement that a jurisdictional agency must submit a map or list locating all wells "which have produced" natural gas from the recommended tight formation. The comments argued that this requirement is unnecessary, burdensome, and may be impossible to meet in cases where records on these wells were either never compiled, were lost, or were destroyed over the years. One comment suggests that the requirement be limited to the identification of wells producing on or after January 1, 1980. Another proposal

is that the requirement be retained for only those formations that did not meet the 0.1 millidarcy permeability standard and are being recommended under the alternative standard.

In response to these comments we have reduced the burden by amending § 271.703(a)(3)(iii) of the final rule to require jurisdictional agencies to submit either a map or list which locates wells which are *currently producing* from the recommended tight formation. We have retained the requirement, as amended, so that the Commission can have information indicating how much the formation was developed prior to its being recommended as a tight formation.

X. Environmental Impact

As stated in the interim rule, staff completed an environmental assessment of this rule in which staff concluded that establishing an incentive price would not constitute a major Federal action significantly affecting the quality of the human environment.

The Commission will continue to investigate the possible effects of the tight formations program and will make a final determination as to environmental impact at such time as the jurisdictional agencies submit their recommendations for tight formations. The information of the jurisdictional agencies when they make their recommendations includes information regarding the identification and location of fresh water aquifers which may be affected by development of the formation.

XI. Retroactive Collections

Some commenters questioned whether interim collection authority under §§ 273.202 and 273.203 would be permitted prior to final designation of a formation as a tight formation. As previously stated the Commission is not providing interim collection authority prior to final

designation of the formation. However, the retroactive collection provisions contained in § 273.20(a)(1)(ii) of the Commission's regulations are applicable to new and recompletion tight formation gas that qualifies under § 271.703(b) to receive the incentive maximum lawful price set forth in § 271.703(a).

XII. Effective Date

These rules shall become effective as final regulations September 22, 1980.

(Department of Energy Organization Act, 42 U.S.C. § 7101, et seq.; E.O. 12009, 42 FR 46267, Natural Gas Policy Act of 1978, 15 U.S.C. 3301-3432)

Subpart G of Part 271, Subpart B of Part 273, and Subpart B of Part 274, of Subchapter H, Chapter I, Title 18, Code of Federal Regulations, are revised as set forth below, effective as final rules on September 22, 1980.

By the Commission.

Kenneth F. Plumb,
Secretary.

[¶ 30,198]

45 F.R. 71563 (October 29, 1980)

18 CFR Part 271

[Docket No. RM79-76; Order No. 99-A]

High-Cost Natural Gas Produced for Tight Formations; Order Denying Rehearing and Clarifying Order No. 99

Issued October 21, 1980.

AGENCY: Federal Energy Regulatory Commission, DOE.

ACTION: Final rule.

SUMMARY: On August 15, 1980, the Federal Energy Regulatory Commission issued Order No. 99 in Docket No. RM79-76 (45 FR 56034, August 22, 1980). In Order No. 99, the Commission established an incentive price under section 107 of the Natural Gas Policy Act of 1978 for gas produced from designated tight formations and set forth the procedure for designation of tight formations and for well category determinations.

This order denies applications for rehearing of Order No. 99 and amends the applicability section and the definition of tight formation gas to clarify that a producer is not required to have a negotiated contract in order to apply for or receive a well category determination. In addition, technical amendments have been made to the definition of negotiated contract price.

EFFECTIVE DATE: October 21, 1980.

FOR FURTHER INFORMATION CONTACT: Colette Bohatch, Federal Energy Regulatory Commission, Room

8100-B, 825 North Capitol Street NE., Washington, D.C. 20426, (202) 357-8033

or

June Perin, Federal Energy Regulatory Commission, Room 8000, 825 North Capitol Street NE., Washington, D.C. 20426, (202) 357-8473.

On August 15, 1980, the Federal Energy Regulatory Commission (Commission) issued Order No. 99 in Docket No. RM79-76 (45 FR 56034, August 22, 1980). Applications for rehearing of Order No. 99 were filed by Pennzoil Company, *et al.*[1] (Pennzoil Group) and Kentucky West Virginia Gas Company (Kentucky-West Virginia).

In Order No. 99, the Commission established an incentive price under section 107 of the Natural Gas Policy Act of 1978 (NGPA) for gas produced from designated tight formations and set forth the procedure for designation of tight formations and for well category determinations.

I. Application of the Pennzoil Group

The Pennzoil Group argues that Order No. 99 will delay producers' efforts to bring increased supplies of gas into the domestic market. The following reasons given by the Pennzoil Group to support its application do not warrant a rehearing. All of the issues presented by the Pennzoil Group and discussed below have been fully considered by the Commission during this rulemaking process.

A. *Designation of tight formations.*—The Pennzoil Group argues that the Order No. 99 procedures for nomi-

[1] This application for rehearing was filed jointly by Pennzoil Company, Pennzoil Producing Company, Pennzoil Oil and Gas, Inc., Pogo Producing Company, Great American Oil Company of Texas, Texas Gulf, Inc., and Ashland Exploration, Inc.

nating and approving tight formations could be streamlined by substituting the procedures of section 503 of the NGPA.

The Commission has the discretion to qualify tight formations under either section 503 or by rulemaking. For the reasons enunciated in the preamble to the final rule, the Commission will continue to designate tight formations by rule in accordance with the provisions of § 271.703.

B. *Order No. 99 pricing provision.*—The Pennzoil Group also raises a question regarding the pricing provision of Order No. 99. In Order No. 99, the Commission established a ceiling price for gas produced from designated tight formations. That ceiling price as set forth in § 271.703(a) is 200 percent of the maximum lawful price under section 103 of the NGPA or the negotiated contract price, whichever is less. The term "negotiated contract price" as defined in 270.702(a)(1) means:

> Any price established by a contract which either specifically references the incentive pricing authority of the Commission under section 107 of the NGPA or contains a fixed rate or a fixed escalator clause.[2]

On this point, the Pennzoil Group argues in its rehearing application that:

> Section 101(b)(9) of the NGPA and the *Mobile-Sierra* doctrine provide a rule of construction that the private contractual rights of producers and pipelines are preserved inviolate *as long as their exercise of those rights does not result in the collection of a price which is in excess of the maximum lawful price.* As such, the Commission has no jurisdiction to abrogate or interfere with the exercise of private contractual rights by producers and pipelines. By

[2] Certain clarifying amendments to this definition are now being adopted by the Commission.

> requiring certain words to be used in a contract, and especially by imposing this requirement retroactively, the Commission has violated section 101(b)(9) of the NGPA and the *Mobile-Sierra* doctrine. [Emphasis added.]

This argument begs the question. Under Order No. 99, no incentive maximum lawful price is applicable unless the contract covering the sale of the tight formation gas contains a clause which specifically references the Commission's section 107(c) incentive pricing authority or which is a fixed rate or a fixed escalator clause. The Commission adopted this pricing provision to assure that a price collected under a contract is necessary to increase gas production.[3] The Commission emphasizes that parties are not barred from renegotiating their contracts to qualify for the Order No. 99 ceiling price.[4]

The Pennzoil Group also argues that section 105(b)(3)(D)[5] and section 313(a)[6] mandate that "broadly

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[3] As stated in the preamble to Order No. 99:

> The Commission reaffirms the position taken in the interim rule that it must limit the availability of the incentive price ceiling to those contracts which specifically refer to it (or to the extent permitted under a fixed rate or fixed escalator clause) because its pricing authority is limited to setting incentive prices "necessary" to encourage additional production. (Mimeo, at p. 37.)

[4] The negotiated contract price requirement appears in the production enhancement rulemaking as a qualification for gas. Similar arguments questioning the Commission's role have been raised in the production enhancement rulemaking and will be addressed there.

[5] Section 105(b)(3) imposes certain limitations on the effect of indefinite price escalator clauses. Section 105(b)(3)(D) establishes an exclusion for certain categories of gas from such limitations.

[6] Section 313(a) provides:

> *High-Cost Natural Gas.*—No price paid in any first sale of high-cost natural gas (as defined in section 107(c)) may be taken into

drafted indefinite price escalator clauses" provide contractual authority for collection of a section 107(c) price.

We disagree. Both sections are couched in the negative. Sections 105(b)(3) and 313(a) impose limitations on the operation of indefinite price escalator clauses. They do not mandate collection of a section 107(c) price where such clauses exist.

C. *Other issues.*—The Pennzoil Group raises other issues regarding the sufficiency of the price and certain requirements for well category determinations and for designation of tight formations. The Commission rejects the arguments raised by the Pennzoil Group on the respective provisions of Order No. 99 for the reasons stated in Order No. 99.

II. Application of Kentucky-West Virginia

Kentucky-West Virginia submits that the Commission unlawfully excluded certain sales of pipeline production from the final rule by failing to include, explicitly, sales of such production within the definition of first sale.

Incentive prices established by the Commission under section 107 like all other maximum lawful prices under Title I of the NGPA are applicable to first sales of natural gas. In Order No. 58, the Commission addressed the issue of first sale treatment of sales made by pipelines, distributors, and their affiliates.[7] All issues raised by

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account in applying any indefinite price escalator clause (as defined in section 105(b)(3)(B)) with respect to any first sale of any natural gas other than high-cost natural gas (as defined in section 107(c)).

[7] Section 270.203 promulgated in Order No. 58, provides that a sale by a pipeline or distributor is not a first sale unless the sale is comprised exclusively of production by the pipelines or distributors or the sale is a mixed volume sale the price of which is not regulated pursuant to the Natural Gas Act (15 U.S.C. §§ 717-717w) or by a state agency empowered by statute to establish, modify, or set aside the rate for such sale.

Kentucky-West Virginia regarding Order No. 99 relate to the Commission's definition of a first sale in Order No. 58. Therefore, they are outside the scope of this rulemaking and the application for rehearing must be denied.

III. Clarification of Order No. 99

Three clarifying amendments have been made to the final rule. The applicability provision of § 271.701 has been amended to delete the reference to a jurisdictional agency determination. The purpose of this amendment is to clarify that a producer is not required to have a negotiated contract price in order to apply for or receive a well category determination from a jurisdictional agency. A corresponding clarifying amendment has been made to the definition of tight formation gas in § 271.703(b)(1). Finally, certain clarifying amendments have been made to the definition of negotiated contract price in § 271.702(a)(1).

Because these amendments effect no substantive change in the rule but are necessary for proper inplementation of the rule, the Commission finds that public notice and comment is unnecessary. For the same reasons, the amendments are being made effective immediately. (5 U.S.C. 553)

The Commission orders:

(1) The applications for rehearing of Order No. 99 filed jointly by the Pennzoil Company, Pennzoil Producing Company, Pennzoil Oil and Gas, Inc., Pogo Producing Company, Great American Oil Company of Texas, Texas Gulf, Inc., and Ashland Exploration, Inc. and Kentucky-West Virginia Gas Company are denied.

(2) Order No. 99 is clarified by amending §§ 271.701, 271.702(a)(1) and 271.703(b)(1) of the Commission's regulations as set forth above, effective October 21, 1980.

(Natural Gas Policy Act of 1978, 15 U.S.C. 3301, *et seq.*; Department of Energy Organization Act, 42 U.S.C.

§ 7107, *et seq.*; Executive Order No. 12009, 42 FR 46267, Natural Gas Act, as amended, 15 U.S.C. 717, *et seq.*)

In consideration of the foregoing, Part 271 of Subchapter H, Chapter I, Title 18, Code of Federal Regulations is amended as set forth below, effective October 21, 1980.

By the Commission.

Kenneth F. Plumb,
Secretary.

APPENDIX C

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

September Term, 1986

No. 85-1835

WILLISTON BASIN INTERSTATE PIPELINE COMPANY,
Petitioner

v.

FEDERAL ENERGY REGULATORY COMMISSION,
Respondent

ARCO OIL AND GAS COMPANY,
Intervenor

[Filed Apr. 24, 1987]

PETITION FOR REVIEW OF AN ORDER OF THE
FEDERAL ENERGY REGULATORY COMMISSION

Before: BORK and D.H. GINSBURG, *Circuit Judges*, and MCGOWAN, *Senior Circuit Judge*.

JUDGMENT

This cause came on to be heard on the petition for review of orders of the Federal Energy Regulatory Commission, and was argued by counsel. On consideration thereof, it is

ORDERED and ADJUDGED, by this Court, that the petition for review herein is hereby dismissed, in accordance with the Opinion for the Court filed herein this date.

Per Curiam

For The Court

/s/ George A. Fisher
GEORGE A. FISHER
Clerk

Date: April 24, 1987

Opinion for the Court filed by Circuit Judge D.H. Ginsburg.

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

September Term, 1986

No. 85-1835

WILLISTON BASIN INTERSTATE PIPELINE CO.

v.

FEDERAL ENERGY REGULATORY COMMISSION

[Filed June 30, 1987]

Before: BORK and D. H. GINSBURG, *Circuit Judges*; MCGOWAN, *Senior Circuit Judge*

ORDER

Upon consideration of petitioner's petition for rehearing, it is

ORDERED, by the Court, that the petition is denied.

Per Curiam

FOR THE COURT:
GEORGE A. FISHER
Clerk

By: /s/ Robert A. Bonner
ROBERT A. BONNER
Deputy Clerk

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

September Term, 1986

No. 85-1835

WILLISTON BASIN INTERSTATE PIPELINE CO.

v.

FEDERAL ENERGY REGULATORY COMMISSION

[Filed June 30, 1987]

Before: WALD, *Chief Judge*; ROBINSON, MIKVA, EDWARDS, RUTH B. GINSBURG, BORK, STARR, SILBERMAN, BUCKLEY, WILLIAMS and D. H. GINSBURG, *Circuit Judges*; MCGOWAN, *Senior Circuit Judge*

ORDER

Petitioner's suggestion for rehearing *en banc* has been circulated to the full court. No member of the court requested the taking of a vote thereon. Upon consideration of the foregoing, it is

ORDERED, by the Court *en banc*, that the suggestion is denied.

Per Curiam

FOR THE COURT:
GEORGE A. FISHER
Clerk

By: /s/ Robert A. Bonner
ROBERT A. BONNER
Deputy Clerk

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT
UNITED STATES COURTHOUSE
333 Constitution Avenue, N.W.
Washington, D.C. 20001-2866

General Information
(202) 535-3300

July 15, 1987

General Counsel
Federal Energy Regulatory Commission
Washington, D.C. 20426

Re: No. 85-1835—Williston Basin Interstate Pipeline Company v. Federal Energy Regulatory Commission (Nos. 338 and 338-A)

Dear Sir:

Pursuant to the provisions of Rule 41(a) of the Federal Rules of Appellate Procedure, transmitted herewith, in lieu of formal mandate, is a copy of this Court's Opinion and a certified copy of the Judgment, both filed on April 24, 1987.

Kindly acknowledge receipt on the enclosed extra copy of this letter.

Very truly yours,

GEORGE A. FISHER
Clerk

By: /s/ Denise Thomas
Deputy Clerk

Enclosures

cc: All Counsel (letter and judgment only).

APPENDIX D

§ 3317. Ceiling price for high-cost natural gas

(a) Wells completed below 15,000 feet.—In the case of any first sale of high-cost natural gas produced from any well the surface drilling of which began on or after February 19, 1977, if such production is from any completion location which is located at a depth of more than 15,000 feet, the maximum lawful price under this section for such natural gas delivered during any month shall be the maximum lawful price, per million Btu's, computed for such month under section 3312 of this title (relating to new natural gas).

(b) Commission authority to prescribe higher incentive prices.—The Commission may, by rule or order, prescribe a maximum lawful price, applicable to any first sale of any high-cost natural gas, which exceeds the otherwise applicable maximum lawful price to the extent that such special price is necessary to provide reasonable incentives for the production of such high-cost natural gas.

(c) Definition of high-cost natural gas.—For purposes of this section, the term "high-cost natural gas" means natural gas determined in accordance with section 3413 of this title to be—

(1) produced from any well the surface drilling of which began on or after February 19, 1977, if such production is from a completion location which is located at a depth of more than 15,000 feet;

(2) produced from geopressured brine;

(3) occluded natural gas produced from coal seams;

(4) produced from Devonian shale; and

(5) produced under such other conditions as the Commission determines to present extraordiary risks or costs.

(d) Provisions for high-cost natural gas to be elective.—If any credit, exemption, deduction, or comparable adjustment applicable to the computation of any Federal tax is specifically allowable with respect to any high-cost natural gas (or category thereof) under any provision of law enacted after November 9, 1978, the provisions of subsections (a) and (b) of this section and the provisions of part B of this subchapter shall not apply to such natural gas produced from any well unless an election to have such provisions apply (in lieu of such credit, exception, deduction, or adjustment) with respect to such natural gas produced from such well is filed with the Commission on or before the later of—

(A) the 30th day after November 9, 1978, under which such credit, exemption, deduction, or adjustment is provided; or

(B) the date the surface drilling of such well began.

(Pub. L. 95-621, Title I, § 107, Nov. 9, 1978, 92 Stat. 3366.)

§ 3411. General rulemaking authority

(a) In general.—Except where expressly provided otherwise, the Commission shall administer this chapter. The Commission, or any other Federal officer or agency in which any function under this chapter is vested or delegated, is authorized to perform any and all acts (including any appropriate enforcement activity), and to prescribe, issue, amend, and rescind such rules and orders as it may find necessary or appropriate to carry out its functions under this chapter.

(b) Authority to define terms.—Except where otherwise expressly provided, the Commission is authorized to define, by rule, accounting, technical, and trade terms used in this chapter. Any such definition shall be consistent with the definitions set forth in this chapter.

(c) Delegation of certain determinations.—The Commission may delegate to any State agency (with the consent of such agency) any of its functions with respect to sections 3315, 3316(b), and 3319(a)(1) and (3) of this title.

(Pub.L. 95-621, Title V, § 501, Nov. 9, 1978, 92 Stat. 3396.)

§ 3413. Determinations for qualifying under certain categories of natural gas

(a) General rule.—

(1) Determination.—If any State or Federal agency makes any final determination which it is authorized to make under subsection (c) of this section for purposes of—

(A) applying the definition of new natural gas under section 3312(c) of this title;

(B) deciding if certain natural gas produced from the Outer Continental Shelf qualifies under section 3312(d) of this title for the new natural gas ceiling price;

(C) applying the definition of new, onshore production well under section 3313(c) of this title;

(D) applying the definition of high-cost natural gas under section 317(c) of this title; or

(E) applying the definition of stripper well natural gas under section 3318(b) of this title;

such determination shall be applicable under this chapter for such purposes unless such determination is reversed under the provisions of subsection (b) of this section or unless such State or Federal agency has waived its authority under the provisions of subsection (c) of this section.

(2) Notice to Commission.—Any Federal or State agency making a determination under paragraph (1) shall provide timely notice in writing of such determination to the Commission. Such notice shall include such substantiation and be in such a manner as the Commission may, by rule, require.

(b) Commission review.—

(1) Authority to review and reverse.—The Commission shall reverse any final State or Federal agency determination described in subsection (a) of this section if—

(A) it makes a finding that such determination is not supported by substantial evidence in the record upon which such determination was made; and

(B) such preliminary finding and notice thereof under paragraph (3) is made within 45 days after the date on which the Commission received notice of such determination under subsection (a) (2) of this section and the final such finding is made within 120 days after the date of the preliminary finding.

(2) Remand on basis of Commission information.—If—

(A) the Commission finds that a State or Federal agency determination is not consistent with information contained in the public records of the Commission, and which is not part of the record upon which such determination was made; and

(B) such preliminary finding and notice thereof under paragraph (3) is made within 45 days after the date on which the Commission received notice of such determination under subsection (a) (2) of this section and the final such finding is made within 120 days after the date of the preliminary finding,

it may remand the matter to such State or Federal agency for consideration of such information. If such agency, after consideration of the information transmitted to it by the Commission, affirms its pre-

vious determination, such determination, as so affirmed, shall be subject to review in accordance with this subsection (other than this paragraph).

(3) Notice.—The Commission shall provide notice of any proposed finding under this subsection to the State or Federal agency which made such determination and those parties identified in the notice to the Commission of such determination.

(4) Judicial review of Commission actions.—

(A) Remands.—Any party identified in the notice to the Commission of a determination by a State or Federal agency may obtain review of any final decision by the Commission to remand under paragraph (2) in the United States Court of Appeals for any circuit in which such party is located or has its principal place of business, or in the United States Court of Appeals for the District of Columbia circuit. The reviewing court shall reverse any such decision if it finds such decision is arbitrary or capricious.

(B) Findings.—Any person aggrieved or adversely affected by a final finding of the Commission under paragraph (1) may within 60 days thereafter file a petition for review of such finding in the United States Court of Appeals for any circuit in which the party involved in such determination is located or has its principal place of business, or in the United States Court of Appeals for the District of Columbia circuit. The reviewing court shall reverse any such finding of the Commission if the State or Federal agency determination involved is supported by substantial evidence.

(c) State authority.—

(1) General rule.—A Federal or State agency having regulatory jurisdiction with respect to the

production of natural gas is authorized to make determinations referred to in subsection (a) of this section.

(2) Waiver.—

(A) In general.—Any Federal or State agency may, in whole or in part, waive its authority to make determinations referred to in subsection (a)(1) of this section by entering into an agreement in accordance with subparagraph (B). If such agency executes such a waiver, the Commission shall, consistent with the agreement, make the determinations which would otherwise be made by such Federal or State agency until the earlier of—

(i) the expiration of the period specified in the agreement, or

(ii) the date such agency transmits to the Commission written notice that it terminates such waiver and assumes the authority to make determinations referred to in subsection (a)(1) of this section.

Any waiver, or termination of any waiver, shall not apply to any determination with respect to any petition therefor which is pending before such agency or the Commission (as the case may be) on the date on which such a waiver or revocation is made.

(B) Agreements.—Any waiver under subparagraph (A) may be made only by a written agreement between the Federal or State agency involved and the Commission. Any such agreement shall set forth the terms and conditions applicable to such waiver.

(3) Procedures applicable.—Determinations of a Federal or State agency referred to in subsection

(a)(1) of this section shall be made in accordance with the procedures generally applicable to such agency for the making of such determinations or comparable determinations under the provisions of Federal or State law, as the case may be, pursuant to which they exercise their regulatory jurisdiction. The Commission may prescribe the form and content of filings with a Federal or State agency in connection with determinations made under this section.

(4) Judicial review.—Any such determination referred to in subsection (a)(1) of this section made in accordance with procedures described in paragraph (3) shall not be subject to judicial review under any Federal or State law except as provided under subsection (b) of this section.

(d) Effect of determinations.—For purposes of this chapter.—

(1) General rule.—Any final determination referred to in subsection (a)(1) of this section made by a Federal or State agency (or by the Commission under subsection (c)(2) of this section) which relates to any natural gas and which is no longer subject to review by the Commission under this section or to judicial review shall thereafter be binding with respect to such natural gas. The preceding sentence shall not apply to any final determination—

(A) if in making such determination the Commission or such Federal or State agency relied on any untrue statement of a material fact; or

(B) if there was omitted a statement of material fact necessary in order to make the statements made not misleading, in light of the circumstances under which they were made, to the Federal or State agency in making such final

determination or to the Commission in reviewing such determination.

(2) Application of title 18.—Any untrue statement or omission of material fact to a Federal or State agency upon which the Commission relied shall be deemed to be statement or entry under section 1001 of Title 18.

(e) Interim collection of maximum lawful price.—

(1) Collection of section 3319 price.—

(A) General rule.—Effective on the first day of the first month beginning after November 9, 1978, a seller of natural gas which is produced from a new well may, in accordance with subparagraph (B), charge and collect the appropriate maximum lawful price under section 3319 of this title for any first sale of such natural gas.

(B) Requirements.—A seller may charge and make collections under subparagraph (A) only in accordance with the following requirements:

(i) Sworn statement. Before any such collection is made, the seller shall file with the Commission, and any Federal or State agency having authority to make determinations referred to in subsection (a)(1) of this section, a written sworn statement that such natural gas is produced from a new well and that such seller believes in good faith that such natural gas is eligible under this chapter to be sold at a price not less than the appropriate maximum lawful price under section 3319 of this title.

(ii) Petition for determination.—Within 90 days after November 9, 1978, the seller files a petition to such Federal or State

agency for a determination under this section.

(iii) Collection subject to refund.—Any such collection made by the seller pending a determination under this section shall be collected subject to a condition of refund, with interest, in the event it is determined by such Federal or State agency that the applicable maximum lawful price is lower than that provided under section 3319 of this title.

(2) Alternate interim collection authority.—

(A) General rule.—Promptly after November 9, 1978, the Commission shall, by rule or order, provide one or more methods under which a seller of natural gas may, in accordance with requirements established, and for such period as may be prescribed, under such rule or order, charge and collect for any first sale of such natural gas the maximum lawful price under subchapter I of this chapter for which a petition is filed for a determination under this section in any case in which such price exceeds the appropriate maximum lawful price under section 3319 of this title.

(B) Collection subject to refund.—Any such collection made by the seller pending a determination under this section shall be collected subject to a condition of refund, with interest. Such refund with interest shall be paid, in accordance with the rule under subparagraph (A), unless it is determined under this chapter that the applicable maximum lawful price is equal to or greater than that collected. In addition, such seller shall comply with such requirements as the Commission shall prescribe in the applicable rule or order to provide ade-

quate assurance that funds, to the extent attributable to a price in excess of the appropriate maximum lawful price under subchapter I of this chapter are available in the event of such refund.

(3) Collection after initial determination.—

(A) General rule.—Effective beginning on the date of the notice of a determination under subsection (a)(2) of this section, a seller of natural gas covered by such determination may, in accordance with subparagraph (B), charge and collect the appropriate maximum lawful price applicable under such determination.

(B) Requirements.—A seller may charge and make collections under subparagraph (A) if such collection is subject to conditions prescribed by the Commission to assure refund, with interest, in the event it is determined under this chapter that the applicable maximum lawful price is lower than that provided under section 3319 of this title.

(Pub. L. 95-621, Title V, § 503, Nov. 9, 1978, 92 Stat. 3397.)

§ 3416. Judicial review

(a) Orders.—

(1) In general.—The provisions of this subsection shall apply to judicial review of any order, within the meaning of section 551(6) of Title 5 (other than an order assessing a civil penalty under section 3414(b)(4) of this title or any order under section 3362 of this title or any order under section 3363 of this title), issued under this chapter and to any final agency action under this chapter required to be made on the record after an opportunity for an agency hearing.

(2) Rehearing.—Any person aggrieved by any order issued by the Commission in a proceeding under this chapter to which such person is a party may apply for a rehearing within 30 days after the issuance of such order. Any application for rehearing shall set forth the specific ground upon which such application is based. Upon the filing of such application, the Commission may grant or deny the requested rehearing or modify the original order without further hearing. Unless the Commission acts upon such application for rehearing within 30 days after it is filed, such application shall be deemed to have been denied. No person may bring an action under this section to obtain judicial review of any order of the Commission unless—

(A) such person shall have made application to the Commission for a rehearing under this subsection; and

(B) the Commission shall have finally acted with respect to such application.

For purposes of this section, if the Commission fails to act within 30 days after the filing of such application, such failure to act shall be deemed final agency action with respect to such application.

(3) Authority to modify orders.—At any time before the filing of the record of a proceeding in a United States Court of Appeals, pursuant to paragraph (4), the Commission may, after providing notice it determines reasonable and proper, modify or set aside, in whole or in part, any order issued under the provisions of this chapter.

(4) Judicial review.—Any person who is a party to a proceeding under this chapter aggrieved by any final order issued by the Commission in such proceeding may obtain review of such order in the United States Court of Appeals for any circuit in which the party to which such order relates is located or has its principal place of business, or in the United States Court of Appeals for the District of Columbia circuit. Review shall be obtained by filing a written petition, requesting that such order be modified or set aside in whole or in part, in such Court of Appeals within 60 days after the final action of the Commission on the application for rehearing required under paragraph (2). A copy of such petition shall forthwith be transmitted by the clerk of such court to any member of the Commission and thereupon the Commission shall file with the court the record upon which the order complained of was entered, as provided in section 2112 of Title 28. Upon the filing of such petition such court shall have jurisdiction, which upon the filing of the record with it shall be exclusive, to affirm, modify, or set aside such order in whole or in part. No objection to such order of the Commission shall be considered by the court if such objection was not urged before the Commission in the application for rehearing unless there was reasonable ground for the failure to do so. The finding of the Commission as to the facts, if supported by substantial evidence, shall be conclusive. If any party shall apply to the court for leave to adduce additional evidence, and

shall show to the satisfaction of the court that such additional evidence is material and that there were reasonable grounds for failure to adduce such evidence in the proceedings before the Commission, the court may order such additional evidence to be taken before the Commission and to be adduced upon the hearing in such manner and upon such terms and conditions as the court deems proper. The Commission may modify its findings as to the facts by reason of the additional evidence so taken, and shall file with the court such modified or new findings, which if supported by substantial evidence, shall be conclusive. The Commission shall also file with the court its recommendation, if any, for the modification or setting aside of the original order. The judgment and decree of the court, affirming, modifying, or setting aside, in whole or in part, any such order of the Commission, shall be final subject to review by the Supreme Court of the United States upon certiorari or certification as provided in section 1254 of Title 28.

(5) Orders remain effective.—The filing of an application for rehearing under paragraph (2) shall not, unless specifically ordered by the Commission, operate as a stay of the Commission's order. The commencement of proceedings under paragraph (4) shall not, unless specifically ordered by the court, operate as a stay of the Commission's order.

(b) Review of rules and orders.—Except as provided in subsections (a) and (c) of this section, judicial review of any rule or order, within the meaning of section 551(4) of Title 5, issued under this chapter may be obtained in the United States Court of Appeals for any appropriate circuit pursuant to the provisions of chapter 7 of Title 5, except that the second sentence of section 705 thereof shall not apply.

(c) Judicial review of emergency orders.—Except with respect to enforcement of orders or subpenas under section 3364(a) of this title, the Temporary Emergency Court of Appeals, established pursuant to section 211(b) of the Economic Stabilization Act of 1970, as amended, shall have exclusive original jurisdiction to review all civil cases and controversies under section 3361, 3362, or 3363 of this title, including any order issued, or other action taken, under such section. The Temporary Emergency Court of Appeals shall have exclusive jurisdiction of all appeals from the district courts of the United States in cases and controversies arising under section 3364(a)(2) of this title; such appeals shall be taken by the filing of a notice of appeal with the Temporary Emergency Court of Appeals within thirty days after the entry of judgment by the district court. Prior to a final judgment, no court shall have jurisdiction to grant any injunctive relief to stay or defer the implementation of any order issued, or action taken, under section 3361, 3362, or 3363 or this title.

(d) Judicial review of certain incremental pricing determinations.—Notwithstanding the preceding provisions of this section, any final determination made under section 3347(c) of this title shall be subject to judicial review in accordance with the provisions of the Natural Gas Act applicable to judicial review of any final determination respecting the grant or denial of any authority to import natural gas or liquefied natural gas.

(Pub.L. 95-621, Title V, § 506, Nov. 9, 1978, 92 Stat. 3404.)

APPENDIX E

Subpart G—High-Cost Natural Gas

AUTHORITY: Dept. of Energy Organization Act (42 U.S.C. 7101, et seq.); E.O. 12009, 42 FR 46267; Natural Gas Policy Act of 1978 (15 U.S.C. 3301-3432; Natural Gas Act, as amended, 15 U.S.C. 717, *et seq.*

§ 271.701 Applicability.

This subpart implements section 107 (b) and (c) of the NGPA and applies to the first sale of natural gas which is:

(a) Tight formation gas for there is a negotiated contract price.

(b) Qualified production enhancement gas.

[Order 99, 45 FR 56044, Aug. 22, 1980, as amended by Order 99-A, 45 FR 71564, Oct. 29, 1980; Order 107, 45 FR 77429, Nov. 24, 1980]

§ 271.702 General rules.

(a) *Definitions.* For purposes of this subpart:

(1) "Negotiated contract price" means any price established by a contract provision that specifically references the incentive pricing authority of the Commission under section 107 of the NGPA, by a contract provision that prescribes a specific fixed rate, or by the operation of a fixed escalator clause.

(2) A "fixed escalator clause" is a provision in a contract for the first sale of natural gas which changes the price for the gas by a specified amount on a specified date.

(3) For the definition of "crude oil," *see* § 270.102 (b) (5).

(4) "Pipeline production price" means any price which is paid by the transmission divisional unit of a pipeline in a first sale to the production divisional unit of that pipeline and which does not exceed the amount paid in comparable first sales between persons not affiliated with such pipeline.

(b) *Cross reference.* For special rules applicable to high-cost natural gas retroactive collections, *see* § 273.204.

[Order 99, 45 FR 56044, Aug. 22, 1980, as amended by Order 99-A, 45 FR 71565, Oct. 29, 1980; Order 391, 49 FR 33859, Aug. 27, 1984]

§ 271.703 Tight formations.

(a) *Maximum lawful price for tight formation gas.* The maximum lawful price, per MMBtu, for the first sale of tight formation gas for which there is a negotiated contract price or a pipeline production price shall be the lesser of:

(1) The negotiated contract price or the pipeline production price, as applicable; or

(2) 200 percent of the maximum lawful price specified for Subpart C—NGPA section 103(b)(1) of Part 271 in Table I of § 271.101(a).

(b) *Definitions.* (1) "Tight formation gas" means natural gas that a jurisdictional agency has determined in accordance with Parts 274 and 275 to be new tight formation gas or recompletion tight formation gas.

(2) "New tight formation gas" is natural gas:

(i) Which is new natural gas, (as defined in section 102(c)), certain OCS gas qualifying for the new natural gas ceiling price (as defined in section 102(d)), or gas produced through a new onshore production well (as defined in section 103(c)); and

(ii) Which is produced from a designated tight formation through a well the surface drilling of which began on or after July 16, 1979.

(3) "Recompletion tight formation gas" is natural gas which is produced from a designed tight formation through a well, the surface drilling of which was begun before July 16, 1979,

(i) If such well was not completed for production from such designated formation prior to July 16, 1979, or

(ii) If such well was completed for production from such designated formation prior to July 16, 1979, such gas is produced from a completion location completed after [the effective date of the final rule], and such gas could not have been produced from any completion location which was in existence in the wellbore on or before December 27, 1983.

(4) "Formation" means any geological formation, or portion thereof described by geological as well as geographical parameters.

(5) A "designated tight formation" is a natural gas formation which is designated a tight formation by the Commission pursuant to paragraph (c) of this section.

(6) "Infill drilling" means any drilling in a substantially developed formation (or a portion thereof) subject to requirements respecting well-spacing or proration units which were amended by the jurisdictional agency after the formation (or portion thereof) was substantially developed and which were adopted for the purpose of more effective and efficient drainage of the reservoirs in such formation. Such amendment may provide for the establishment of smaller drilling or production units or may permit the drilling of additional wells on the original units.

(c) *Designation of tight formations*—(1) *General.* Upon the written recommendation by the jurisdictional

agency, submitted in accordance with the requirements of this section, the Commission may approve a recommendation that a natural gas formation be designated as a tight formation.

(2) *Guidelines.* (i) The Commission will approve the designation of any formation recommended by a jurisdictional agency if the formation meets each of the following guidelines:

(A) The estimated average *in situ* gas permeability, throughout the pay section, is expected to be 0.1 millidarcy or less.

(B) The stabilized production rate, against atmospheric pressure, of wells completed for production in the formation, without stimulation, is not expected to exceed the production rate determined in accordance with the following table:

If the average depth to the top of the formation (in feet)		The maximum allowable production rate (in thousand cubic feet per day) may not exceed—
exceeds—	but does not exceed—	
0	1,000	44
1,000	1,500	51
1,500	2,000	59
2,000	2,500	68
2,500	3,000	79
3,000	3,500	91
3,500	4,000	105
4,000	4,500	122
4,500	5,000	141
5,000	5,500	163
5,500	6,000	188
6,000	6,500	217
6,500	7,000	251
7,000	7,500	290
7,500	8,000	336

If the average depth to the top of the formation (in feet)		The maximum allowable production rate (in thousand cubic feet per day) may not exceed—
exceeds—	but does not exceed—	
8,000	8,500	388
8,500	9,000	449
9,000	9,500	519
9,500	10,000	600
10,000	10,500	693
10,500	11,000	802
11,000	11,500	927
11,500	12,000	1,071
12,000	12,500	1,238
12,500	13,000	1,432
13,000	13,500	1,655
13,500	14,000	1,913
14,000	14,500	2,212
14,500	15,000	2,557

(C) No well drilled into the recommended tight formation is expected to produce, without stimulation, more than five barrels of crude oil per day.

(D) If the formation or any portion thereof was authorized to be developed by infill drilling prior to the date of recommendation and the jurisdictional agency has information which in its judgment indicates that such formation or portion subject to infill drilling can be developed absent the incentive price established in paragraph (a) of this section then the jurisdictional agency shall not include such formation or portion thereof in its recommendation.

(ii) The Commission will consider and may approve or disapprove a recommendation by a jurisdictional agency to designate as a tight formation any formation which meets the guidelines contained in paragraph (c)

(2) (i) (B) and (C) of this section, but does not meet the guideline contained in paragraph (c) (2) (i) (A) of this section, if the jurisdictional agency makes an adequate showing that the formation exhibits low permeability characteristics and the price established in paragraph (a) of this section is necessary to provide reasonable incentives for production of the natural gas from the recommended formation due to the extraordinary costs associated with such production.

(3) *Content of recommendations.* A recommendation that a formation should qualify as a designated tight formation shall contain the following information:

(i) Geological and geographical descriptions of the formation which is recommended for classification as a tight formation;

(ii) Geological and engineering data to support the recommendation and the source of that data;

(iii) A map which clearly locates wells which are currently producing from the recommended tight formation or a list locating all wells which are currently producing natural gas from the recommended tight formation;

(iv) A report of the extent to which existing State and Federal regulations will assure development of the recommended tight formation will not adversely affect any fresh water aquifers (during both hydraulic fracturing and waste disposal operations) that are or are expected to be used as a domestic or agricultural water supply;

(v) If the formation is recommended under paragraph (c) (2) (ii) of this section, the types and extent of enhanced production techniques which are expected to be necessary and the estimated expenditures necessary for employing those techniques; and the degree of increase in production to be expected from use of such techniques and engineering and geological data to support that estimate;

(vi) Any other information which the jurisdictional agency deems relevant; and

(vii) Any other information requested by the Commission.

(4) *Commission review of recommendations.* Upon receipt of a recommendation submitted in accordance with this section, the Commission shall publish in the FEDERAL REGISTER, a notice of proposed rulemaking containing such recommendation. After review of any comments, the Commission will prescribe a rule approving or disapproving the recommendation.

(d) *Designated tight formations.* The following formations are designated as tight formations. A more detailed description of the geographical extent and geological parameters of the designated tight formations is located in the Commission's official file for Docket No. RM79-76, subindexed as indicated, and is also located in the official files of the jurisdictional agency that submitted the recommendation.

(1) *The Cotton Valley Group in Texas.* RM79-76 (Texas-1).

(i) *The Cotton Valley Group consisting of the Cotton Valley Sandstone, the Bosiser Shale and the Cotton Valley Lime Formations*—(A) *Delineation of formation.* The northern boundary of the Cotton Valley Group is the Texas-Oklahoma border extending through Fannin, Lamar, and Red River Counties; the eastern boundary is formed by the Texas-Arkansas border and the Texas-Louisiana border; the southern boundary is along the Angelina-Caldwell flexture, running through Sabine, San Augustine, Angelina and Trinity Counties; the western boundary is set by the Mexia-Talco fault zone through Limestone, Navarro and Kaufman Counties.

(B) *Depth.* The Cotton Valley Sandstone is encountered at an average depth of approximately 7,000 feet to the north, 8,000 feet to the east, between 10,000 and

11,000 feet to the south, and 5,000 feet to the west; the Bossier Shale is encountered at 7,700 feet to the north, 10,720 feet to the east, 12,600 feet to the south, and 5,340 feet to the west: the Cotton Valley Lime is encountered at 8,000 feet to the north, 11,400 feet to the east, 13,200 feet to the south, and 5,500 feet to the west.

(ii) *The Cotton Valley Sandstone in the Paige, N. E. Field area*—(A) *Delineation of formation.* The Cotton Valley Sandstone in the Paige, N. E. Field area is found in the eastern portion of Bastrop County, Texas, in Railroad Commission District No. 1. The boundaries of the Cotton Valley Sandstone are approximately 2.5 miles around the Hou-Tex Oil and Gas No. 1 O. R. Mitchell Well. This well is in the Paige, N. E. Field, located two miles from Paige, Texas, in the Wm. Boatwright Survey, A-82.

(B) *Depth.* The top and base of the Cotton Valley Sandstone in the Paige, N. E. Field area are found at the approximate subsea depths of —11,520 feet and —12,780 feet, respectively. The maximum thickness of the formation is approximately 1,790 feet.

(2) *The Mancos "B" Formation in Colorado.* RM79-76 (Colorado-2).

(i) *Delineation of formation.* The Mancos "B" Formation is located approximately midway between Grand Junction and Rangely, Colorado, and straddles the Rio Blanco-Garfield county line from the Utah-Colorado state line east to the Douglas Pass and Baxter Pass Unit Area, underlying approximately 195,200 contiguous acres of land in Rio Blanco and Garfield Counties, Colorado.

(ii) *Depth.* The average depth to the top of the Mancos "B" Formation is approximately 3,475 feet.

(3) *The Frontier Formation in Wyoming.* RM79-76 (Wyoming-1).

(i) *Delineation of formation.* The Frontier Formation is located in the Moxa Arch area in portions of Sweetwater, Uinta, and Lincoln Counties, Wyoming.

(ii) *Depth.* The top of the Frontier Formation is marked by the Hilliard Shale above, and the bottom of the formation is marked by the Mowry Shale, below. The average depth of the top of the Frontier Foundation ranges from approximately 11,100 feet to 11,140 feet.

(4) *The Mesaverde Formation in Wyoming.* RM79-76 (Wyoming-2).

(i) *Delineation of formation.* The Mesaverde Formation is located in the Wamsutter Area in portions of Sweetwater, and Carbon Counties, Wyoming.

(ii) *Depth.* The top of the Mesaverde Formation is marked the Lewis Shale above, and the bottom of the formation is marked by the Steele Shale, below. The average is approximately 10,125 feet.

(5) *The Austin-Mississippian Formation in New Mexico.* RM79-76 (New Mexico-1).

(i) *Delineation of formation.* The Austin-Mississippian Formation is located entirely within Lea County, New Mexico. The area consists of 138,240 contiguous acres of land located approximately 6 to 12 miles north of Lovington, New Mexico.

(ii) *Depth.* The average depth to the top of the Austin-Mississippian Formation is approximately 13,250 feet.

(6) *The Mancos "B" Formation in Colorado.* RM79-76 (Colorado-6).

(i) *Delineation of formation.* The Mancos "B" Formation is located in northwestern Colorado in the North Douglas Creek area in Rio Blanco County, Colorado, approximately 10 miles south of the town of Rangely, Colorado, on the Douglas Creek Arch which separates the Uinta and Piceance Creek Geologic Basins.

(ii) *Depth.* The average depth to the top of the Mancos "B" Formation is approximately 2,500 feet.

(7) *The Fort Union Formation in Colorado.* RM79-76 (Colorado-4).

(i) *Delineation of formation.* The Fort Union Formation is located in the Rio Blanco and Dry Gulch Units of Rio Blanco County, Colorado, approximately 40 miles southwest of Meeker, Colorado, and 30 miles northwest of Rifle, Colorado. The area is bounded on the north and south by synclinal and anticlinal trends, and on the northeast by an anticlinal closure known as the Piceance Creek Dome.

(ii) *Depth.* The average depth to the top of the Fort Union Formation is approximately 4,700 feet.

(8) *The Mesaverde Formation in Colorado.* RM79-76 (Colorado-4).

(i) *Delineation of formation.* The Mesaverde Formation is located in the Rio Blanco and Dry Gulch Units of Rio Blanco County, Colorado, approximately 40 miles southwest of Meeker, Colorado, and 30 miles northwest of Rifle, Colorado. The area is bounded on the north and south by synclinal and anticlinal trends, and on the northeast by an anticlinal closure known as the Piceance Creek Dome.

(ii) *Depth.* The average depth to the top of the Mesaverde Formation is approximately 7,200 feet.

(9) *The Mancos Formation to the base of the Mancos "B" Zone in Colorado.* RM79-76 (Colorado-4).

(i) *Delineation of formation.* The Mancos Formation to the base of the Mancos "B" Zone is located in the Rio Blanco and Dry Gulch Units in Rio Blanco County, Colorado, approximately 40 miles southwest of Meeker, Colorado and 30 miles northwest of Rifle, Colorado. The area is bounded on the north and south by synclinal and anticlinal trends, and on the northeast by an anticlinal closure known as the Piceance Creek Dome.

(ii) *Depth.* The average depth to the top of Mancos Formation is approximately 10,500 feet.

(10) *Canyon Sandstone Formation in Texas.* RM79-76 (Texas-2)

(i) The Canyon Sandstone Formation in Crockett, Edwards, Schleicher, Sutton, Terrell and Val Verde Counties, Texas.

(A) *Delineation of formation.* The Canyon Standstone Formation is found in portions of Crockett, Edwards, Schliecher, Sutton, Terrell and Val Verde Counties, Texas.

(B) *Depth.* In the east, the top of the Upper Canyon (Sonora) of the Canyon Standstone Formation is encountered at a depth of approximately 4,775 feet and the base of the Lower Canyon extends to 8,953 feet, for a total thickness of 4,178 feet. In the west, the top of the Upper Canyon (Ozona), the only section of the Canyon Sandstone Formation to occur in the west, is encountered at an approximate depth of 2,675 feet in the south and 6,100 feet in the north. The base of the Upper Canyon (Ozona) appears at an approximate depth of 3,915 feet in the south, and 7,278 feet in the north, and its thickness ranges from approximately 1,240 feet in the north to 1,178 feet in the south.

(ii) The Canyon Sandstone Formation in the KWB (Canyon) Field, Tom Green County, Texas.

(A) *Delineation of formation.* The designated area of the Canyon Standstone Formation in the KWB (Canyon) Field is located 2.5 miles south of the town of Carlsbad in Tom Green County, Texas, and consists of the following surveys: TTRR Co. 1113 and 1135; TCRR Co. 1137 and 1139; H & TC RR Co. 37; J. S. Turner 1132; W. Turner 1114, 1136, 1138, and 1140; Mason-Perry Co. (Subdivision #1 of Collins Ranch) 48, 49, 52 thru 58 and 214 A&B thru 295; Mason-Perry Co. (Subdivision #2 of Collins Ranch) 29.

(B) *Depth.* The top of the Canyon Sandstone Formation within the designated area ranges from approximately 3,200 to 3,800 feet subsea and is identified on the log of the Mitchell Energy Corporation McWhorter 218 No. 2 well as a 900 foot thick interval occurring between the measured depths of 5,100 and 6,000 feet.

(iii) *Irion County*—(A) *Delineation of formation.* The Canyon Standstone Formation is located in all of the portion of Irion County which lies to the east of a straight line directed between the junction of Crockett, Schleicher, and Irion Counties at the south end of the line and the junction of Reagan, Tom Green, and Irion Counties at the north end of the line.

(B) *Depth.* The Canyon Sandstone Formation is that interval from 6,290 feet to the top of the Strawn Formation at 7,870 feet shown on the electric log of the John H. Hill, McManus No. 1 well located in the north central part of Irion County in Section 35, Block 6, H&TC RR. Co. Survey. The top of the formation dips at a rate of approximately 50 feet per mile in a west-southwest direction across the designated area.

(11) *Wattenberg J Sand Formation in Colorado.* RM 79-76 (Colorado-1).

(i) *Wattenberg J Sand Formation*—(A) *Delineation of formation.* The Wattenberg J Sand Formation is located north and east of Denver, Colorado, on the western flank of the Denver-Julesberg Basin, underlying approximately 702,000 acres of land in Boulder, Adams, Larimer, and Weld Counties, Colorado. This formation underlies portions of Township 1 South, Range 64 through 68 West; Township 2 South, Ranges 64 and 65 West; Townships 1 and 2 North, Ranges 63 through 69 West: Townships 3 and 4 North, Ranges 63 through 68 West; Township 5 North, Ranges 63 through 69 West, 6th P.M.; Township 2 North, Range 68 West. 6th P.M., Sec. 13W/2.

(B) *Depth.* The Wattenberg J Sand Formation ranges in depth from 7,600 feet to 8,400 feet. The average depth is 8,000 feet.

(ii) *The J Sand Formation,* RM79-76 (Colorado-1 Addition)—(A) *Delineation of formation.* This formation underlies all or portions of Townships 1 and 2 South, Ranges 69 and 70 West; Townships 1 and 2 North, Range 70 West; Townships 3 and 4 North, Ranges 69 and 70 West; Township 5 North, Range 63 West; Township 6 North, Ranges 63 through 69 West, 6th P.M., in Boulder, Larimer, Jefferson and Weld Counties, Colorado.

(B) *Depth.* The J Sand Formation ranges from a depth of 7,600 feet to 8,400 feet. The average depth is approximately 8,000 feet.

(iii) *The J Sand Formation.* RM79-76 (Colorado-1 Addition II)—(A) *Delineation of formation.* This formation underlies all or portions of Township 1 South, Range 63 West, and Township 2 South, Ranges 63 and 64 West, 6th P.M., in Adams County, Colorado.

(B) *Depth.* The J Sand Formation ranges from a depth of 7,600 feet to 8,400 feet. The average depth is approximately 8,000 feet.

(12) *Cisco Sandstone Formation in Texas.* RM79-76 (Texas-3)

(i) *The Sallie (Cisco) Field*—(A) *Delineation of formation.* The Sallie (Cisco) Field in the Cisco Sandstone Formation is located in Sections 58, 59, 60, and 72, Block 2, T&P RR Survey, northeast Reagan County, Texas, and Section 42, Block 2 T&P RR Survey, southwest Sterling County, Texas.

(B) *Depth.* The top of the Cisco Sandstone Formation is located at an approximate depth of 8,030 feet and is approximately 300 feet thick.

(ii) *The Credo, East (Cisco, Upper) Field*—(A) *Delineation of formation.* The Upper Cisco Formation is located in the northwestern corner of Sterling County, in west Texas, Railroad Commission District 8, and includes Sections 149, 150, 151, 170, 171, 172, 177, 178, 179, 198 through 207 and 226 through 230 of Block 29, W&NW RR Co. Survey; Sections 1 through 6 and 15 through 18 of Block 30, W&NW RR Co. Survey; Sections 1 through 5, 5½, 5¾, 6(A-1013), 6(A-1269, A-1293 and A-1305), 7 through 10, 10½, and 11 through 13 of Block 31, TWP. 4-S, T&P RR Co. Survey; Section 2 of Lily Roberts Survey; Sections 1, 2 and 4 of J. G. Soulard, Survey; Sections 5 through 8, and 18 of Block 14, SP & RR Co. Survey; Sections 1 through 36 of Block 23, H & TC RR Co. Survey; and Sections 46 through 50, 95 through 101, 127, 182, and 207 of Block 17, SP & RR Co. Survey.

(B) *Depth.* The top and base of the Upper Cisco Formation located in the Credo, East (Cisco, Upper) Field, are found at an approximate depth of 7,125 feet and 7,550 feet, respectively, as measured in the log of the HNG Oil Co. No. 21-1 McEntire well.

(iii) *The Cisco-Canyon Formation*—(A) *Delineation of formation.* The Cisco-Canyon Formation is found in the area of the Conger (Penn) Field and the Conger, S.W. (Penn) Field in Glasscock, Reagan and Sterling Counties, Texas, Railroad Commission Districts 7C and 8. The area includes the following surveys: T&P RR Block 33, T-5-S, Sections 34, 36, and W ½ of 38; T&P RR, Block 32, T-5-S, Sections 13 through 17, 20 through 29, 32 through 42 and 44 through 48; EL & RR RR Sections 1, 2, 3 and 4; D. L. Carver Section 4; H. T. Tweedle Section 2; T&P RR, Block 2, Sections 3, 4, 9 through 14, 21 through 26, 33 through 36, 41, 43, 44, 49 through 52, 61, 62, 69, 70, 71, 89 through 92, 100, 118, 128, 146, 155 and 156; GC & SF RR Sections 1 and 3; GC & SF RY Section 1; W. C. Elam Section 4; CT

& MC RR Section 2; W. R. Barton Section 4; S. H. Birdwell Section 17; Brooks & Burleson Sections 1 and 2; T. B. Wilson Section 2; C&M RR Section 1; H&TC RR, Block 22, Sections 19 through 36; T&P RR, Block 31, T-5-S, Sections 4, 5, and 7 through 30; O. R. Wilson Section 2; Mrs. Ann Morrison Section 7; F. A. Brooks Section 4; and the north 656.65 acres of the north part of Moses Herrin No. 6 Block A.

(B) *Depth.* The depth to the top of the Cisco Formation varies from approximately 8,670 feet in the southwest part of the area to 6,990 feet in the northeast. The depth to the top of the Canyon Formation varies from approximately 8,810 feet in the southwest to 7,370 feet in the northeast. Total thickness of the two formations varies from approximately 200 feet in the southwest to 710 feet in the northeast.

(13) *The Vicksburg UV Formation in Texas.* RM79-76 (Texas-4).

(i) *Delineation of formation.* The Vicksburg UV Formation is found in Hidalgo County, Texas.

(ii) *Depth.* The top of the Vicksburg UV Formation is located at an approximate depth of 12,304 feet with an approximate thickness of 1,155 feet.

(14) *The Vicksburg Y Formation in Texas.* RM79-76 (Texas-5).

(i) *Delineation for formation.* The Vicksburg Y Formation is found in Hidalgo County, Texas.

(ii) *Depth.* The top of the Vicksburg Y Formation in the McAllen Ranch Field is located at an approximate depth of 13,595 feet in the north and 13,244 feet in the south and ranges in thickness from approximately 1,955 feet in the north to 1,717 feet in the south.

(15) *The Arkadelphia Formation in Louisiana.* RM 79-76 (Louisiana-1).

(i) *Delineation of formation.* The Arkadelphia Formation is found in Union Parish, Louisiana.

(ii) *Depth.* The Arkadelphia Formation is defined as that formation occuring between the measured depths of 2,028 feet and 2,080 feet.

(16) *The Fort Union Formation in Wyoming.* RM79-76 (Wyoming-3).

(i) *Delineation of formation.* The Fort Union Formation is found in Pinedale Field in Sublette County, Wyoming.

(ii) *Depth.* The Fort Union Formation is defined as that formation occurring between the Wasatch Formation above and the Lance Formation below, at an average measured depth interval of 7,258 feet to 10,516 feet.

(17) *The Midway (11,740') Sandstone Formation in Texas.* RM79-76 (Texas-6).

(i) *Delineation of formation.* The Midway (11,740') Sandstone Formation is located in the northwestern portion of Montgomery County and the southeastern portion of Grimes County, Texas.

(ii) *Depth.* The top of the Midway (11,740') Sandstone Formation is located at an approximate depth of 11,746 feet and the base is located at an approximate depth of 11,774 feet, giving it a thickness of 28 feet.

(18) *Lower Wilcox Formation in Texas.* RM79-76 (Texas-7).

(i) *Three County Area*—(A) *Delineation of formation.* The Lower Wilcox Formation is found in the southern portion of Austin County, the northern portion of Wharton County, and the eastern portion of Colorado County, Texas.

(B) *Depth.* The top of the Lower Wilcox Formation is located at an approximate depth of 11,700 feet and

the base is located at an approximate depth of 12,700 feet, giving a thickness of 1,000 feet.

(ii) *Bonus, S. (Wilcox 13,900') Field*—(A) *Delineation of formation.* The Lower Wilcox Formation is found in the Bonus, S. (Wilcox 13,900') Field, Wharton County, Texas, approximately 10 miles south of the town of Eagle Lake. The formation is described by a 2.5 mile radius around the Laurel Fuel Company Winterman No. 3 well, and covers approximately 19.6 square miles.

(B) *Depth.* The top of the Lower Wilcox Formation is at an approximate depth of 13,900 feet and is between 60 and 70 feet thick.

(iii) *Lower Wilcox (Midcox) Formation*—(A) *Delineation of formation.* The Lower Wilcox (Midcox Formation is found approximately five miles northeast of the town of Rock Island in central Colorado County, Texas, Railroad Commission District 3. The designated area is within a 2.5 mile radius around the Holt Oil & Gas Corporation (formerly Perkins Oil Company) Kleimann Unit No. 1 well located in the J. E. Hester Survey A-740.

(B) *Depth.* The top of the Lower Wilcox (Midcox) Formation is found at an approximate log depth of 11,650 feet in the Kleimann Unit No. 1 well and is 344 thick.

(19) *Atoka Foundation in New Mexico.* RM79-76 (New Mexico-2).

(i) *Delineation of formation.* The Atoka Formation is found in Lea County, New Mexico, and underlies an area approximately 9 miles north of Lovington, New Mexico, 3 miles southwest of Tatum, New Mexico, and 15 miles west of the Texas border. The formation underlies Township 12 South, Range 35 East, Sections 31 through 36; Township 12 South, Range 36 East, Sections

31 through 36; Township 13 South, Ranges 35 and 36; All; Township 14 South, Range 35 East, Sections 1 through 24; and Township 14 South, Range 36 East, Sections 1 through 24, NMPM.

(ii) *Depth.* The Atoka Foundation is defined as that formation the depth to the top of which ranges from 11,500 to 12,450 feet, and averages 12,200 feet, and the base of which is defined by the top of the Morrow Foundation. The thickness varies from 375 to 750 feet.

(20) *The Niobrara Formation in Colorado.* RM79-76 (Colorado-3).

(i) *Delineation of formation.* The Niobrara Formation is located in north and east of Denver, Colorado, on the eastern flank of the Denver-Julesberg Basin, underlying all lands in Cheyenne, Kit Carson, Lincoln, Logan, Phillips, Sedgwick, Washington, and Yuma Counties, Colorado. The designated formation does not include the Mildred and Waverly Fields, or that portion of the Beecher Island Field on which wells were drilled prior to the issuance of the infill drilling order of Colorado, No. 300-5.

(ii) *Depth.* The depth of the Niobarara Formation ranges from 1300 feet to approximately 3000 feet.

(21) *The Clinton Sandstone Formation in Ohio.* RM 79-76 (Ohio-1).

(i) *Delineation of formation.* The Clinton Sandstone Formation is found in eastern Ohio, and extends from Lake Erie on the north, to the Kentucky border on the south, and from Licking County in central Ohio on the west to the Pennsylvania and West Virginia borders on the east. The designated tight formation does not include any areas which are gas storage reservoirs or reservoir protective areas, as defined by maps on file with the Ohio Oil and Gas Division. Department of Resources and the Commission.

(ii) *Depth.* The Clinton Sandstone Formation occurs within the Silurian Cataract System, between the Dayton Limestone and the Queenston Shale, found at approximately 2,500 feet in the updip areas near its pinch out, dipping to the southeast approximately 50 feet per mile.

(22) *Haynesville Formation in Louisiana.* RM79-76 (Louisiana-2).

(i) *Arkana Field, Bossier Parish*—(A) *Delineation of the formation.* The Haynesville Formation is found in the northern part of Bossier Parish, Louisiana, on the Arkansas border and consists of the following: Township 23 North, Range 12 West, Sections 5 through 8, and 17 through 19; Township 23 North, Range 13 West, Sections 1 through 24; Township 23 North, Range 14 West, Sections 1, 2, 6 through 24, and 27 through 34; and Township 23 North, Range 15 West, Sections 1 through 3, 22 through 27, and 34 through 36.

(B) *Depth.* The top of the Haynesville Formation is located at a measured depth of 10,360 feet, with the base located at 10,845 feet on the induction electrical log of the Crystal Oil Company Hall No. 1 Well. In the Arkana Field, the Haynesville Formation consists of three members; the upper member varies in thickness from 120 to 220 feet, the middle member, the Haynesville Sand, ranges between 120 and 220 feet thick, and the lowest member, the Buckner, is between 200 and 400 feet thick.

(ii) *Colquitt Field, Claiborne Parish*—(A) *Delineation of formation.* The Haynesville Formation Reservoir B, in the Colquitt Field, is located in Claiborne Parish, Louisiana, and consists of the S ½ of the S/W ¼ of Section 27, the S ½ and the S ½ of the NW ¼ of Section 29, and the S ½ and the NW ¼ and the S ½ of the NE ¼ of Section 30, and the N ½ of Section 34, Township 23 North, Range 6 West, and the W ½ of Section 24, and the N ½ and the SE ¼ of Section 25, Township 23 North, Range 7 West.

(B) *Depth.* The Haynesville Formation, Reservoir B, is defined as that gas and condensate bearing formation occurring between the depths of 9,510 feet and 10,730 feet, on the electric log measurement of the Cities Service Company Hatter A No. 1 Well, located in Section 29, Township 23, Range 6 West.

(23) *The Mancos "B" Formation in Colorado.* RM79-76 (Colorado-11).

(i) *Delineation of formation.* The Mancos "B" Formation is found in the Douglas Creek Arch area in Rio Blanco County, Colorado.

(ii) *Depth.* The Mancos "B" Formation is a member of the Mancos Shale of upper Cretaceous age, occurring in the approximate middle third of the Mancos sequence. The average depth to the top of the Mancos "B" Formation is 3,603 feet.

(24) *The Mancos "B" Formation in Colorado,* RM79-76 (Colorado-13).

(i) *Delineation of formation.* The Mancos "B" Formation is found in Rio Blanco County, Colorado, Approximately 70 miles northwest of Grand Junction, Colorado, on the northeast flank of the Douglas Creek Arch in the Piceance Basin.

(ii) *Depth.* The Mancos "B" Formation is a member of the Mancos Shale of upper Cretaceous age, occurring in the approximate upper third of the Mancos sequence. The thickness of the Mancos "B" Formation ranges from 400 to 700 feet. The depth to the top of the Mancos "B" Formation ranges from 1,500 to 8,400 feet and averages 3,500 feet.

(25) *The Lower Mesaverde Formation in Colorado.* RM79-76 (Colorado-5).

(i) *Delineation of formation.* The Lower Mesaverde Formation, consisting of the Rollings, Cozzett and Cor-

coran Sandstone members, is located in the Plateau Creek Field area 30 miles east-northeast of Grand Junction, Colorado in Mesa County, Colorado. The designation area includes Township 9 South, Range 95 West, Section 19 through 23, 26 through 36; Township 9 South, Range 96 West, Section 25 through 36, Township 9 South, Range 97 West, Sections 25 and 36; Township 10 South, Range 94 West, Sections 6, 7, 18, 19, 30 and 31; Township 10 South, Range 95 West, Section 1 through 16 NW¼ and SE¼ of Section 17, 20 through 29, 31 through 36; Township 10 South, Range 96 West, Sections 1 through 11, 14 through 22, 29 through 32, S½ and NE¼ of Section 33, Sections 34 through 36; Township 10 South, Range 97 West, Sections 1, 12, 13, 24, 25 and 36; All from the 6th P.M.

(ii) *Depth.* The average to the top of the Lower Mesaverde Formation is 3,850 feet.

(26) *The Dakota Formation in Colorado.* RM79-76 (Colorado-7).

(i) *Delineation of formation.* The Dakota Formation is found in La Plata and Archuleta Counties, Colorado, underlying Township 34 North, Ranges 6 through 8 West (North of the Ute Line), Sections 1 through 18; Township 34 North, Range 9 West (North of the Ute Line), Sections 1 through 12; Township 34½ North, Range 9 West (North of the Ute Line), Sections 31 through 36; Township 35 North, Ranges 6 through 8 West, Sections 1 through 36; and Township 35 North, Range 9 West, Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36.

(ii) *Depth.* The Dakota Formation is defined as that formation, the top of which varies in depth from 7,500 feet to 8,000 feet and the bottom of which is defined by the top of the Morrison Formation.

(27) *Sanastee Formation in Colorado.* RM79-76 (Colorado-8).

(i) *Delineation of formation.* The Sanastee Formation is found in La Plata and Archuleta Counties, Colorado, underlying Township 34 North, Ranges 6 and 7 West (South of the Ute Line), Sections 1 through 36; and Township 34 North, Ranges 8 and 9 West (South of the Ute Line), Sections 1 through 24.

(ii) *Depth.* The Sanastee Formation is defined as that formation occurring within the Mancos shale at intervals from approximately 7,500 to 7,700 feet.

(28) *Dakota Formation in Colorado.* RM79-76 (Colorado-8).

(i) *Delineation of formation.* The Dakota Formation is found in La Plata and Archuleta Counties, Colorado, underlying Township 34 North, Ranges 6 and 7 West (South of the Ute Line), Sections 1 through 36; and Township 34 North, Ranges 8 and 9 West (South of the Ute Line), Sections 1 through 24.

(ii) *Depth.* The Dakota Formation is defined as that formation the depth to the top of which averages approximately 7,600 feet and the base of which is defined by the top of the Morrison Formation.

(29) *Cozzette Formation in Colorado.* RM79-76 (Colorado-9).

(i) *Delineation of information.* The Cozzette Formation is found in Mesa and Garfield Counties, Colorado. It is located northeast of the City of Grand Junction, Colorado, and occupies an area known locally as the Wagon Track Tight Gas and Sand area. The Cozzette Formation underlies Township 8 South, Ranges 98 and 99 West, Sections 1 through 36, and Range 100 West, Sections 21 through 28 and 33 through 36; Township 9 South, Range 97 West, Sections 1 through 24, 26 through 35, Ranges 98 and 99 West, Sections 1 through 36, Range 100 West, Sections 1 through 4, 9 through 14, 23, 24, 25 and 36; Township 10 South, Range 97 West, Sections

2 through 11, Range 98 West, Sections 1 through 12, and Range 99 West, Sections 1 through 5 and 9 through 12.

(ii) *Depth.* The Cozzette Formation is defined as that formation occurring within the Mount Garfield Formation in the Mesaverde Group and which is found at an average measured depth of 2,478 feet.

(30) *Corcoran Formation in Colorado.* RM79-76 (Colorado-9).

(i) *Delineation of formation.* The Corcoran Formation is found in Mesa and Garfield Counties, Colorado. It is located northeast of the City of Grand Junction, Colorado, and occupies an area locally known as the Wagon Track Tight Sand area. The Corcoran Formation underlies Township 8 South, Ranges 98 and 99 West, Sections 1 through 36, and Range 100 West, Sections 21 through 28 and 33 through 36; Township 9 South, Range 97 West, Sections 1 through 24, 26 through 35, Ranges 98 and 99 West, Sections 1 through 36, Range 100 West, Sections 1 through 4, 9 through 14, 23, 24, 25 and 36; Township 10 South, Range 97 West, Sections 2 through 11, Range 98 West, Sections 1 through 12, and Range 99 West, Sections 1 through 5 and 9 through 12.

(ii) *Depth.* The Corcoran Formation is defined as that formation occurring within the Mount Garfield Formation of the Mesaverde Group and which is found at an average depth of 2,673 feet.

(31) *The Abo Formation in New Mexico.* RM79-76 (New Mexico-3).

(i) *Delineation of formation.* The Abo Formation is located in DeBaca County, New Mexico, Township 2 South, Ranges 22 through 27 East, and Township 3 South, Ranges 22 through 26 East, and in Chaves County, New Mexico, Township 3 South, Range 27 East, Townships 4, 5, 9 and 10 South, Ranges 22 through 27 East,

Townships 6 through 8 South, Ranges 22 through 28 East, Township 11 South, Ranges 22 through 25 East, Township 12 South, Ranges 22 through 24 East, Township 13 South, Ranges 22 and 23 East, Township 9 South, Range 24 East, Township 9½ South, Range 24 East, and Township 14 South, Range 22 East.

(ii) *Depth.* The Abo Formation averages about 677 feet in thickness and the depth to the top of the formation averages about 3,650 feet.

(32) *Fruitland Formation in New Mexico.* RM79-76 (New Mexico-4).

(i) *Delineation of formation.* The Fruitland Formation consists of the Northeast Blanco Unit, found in San Juan and Rio Arriba Counties, New Mexico, approximately 18 miles east of the city of Aztec, New Mexico, on the northeast flank of the San Juan Basin. It encompasses the following: Township 30 North, Range 7 West, Sections 2 through 10, 17 through 21, Section 16-W/2, Section 29-N/2; Township 30 North, Range 8 West, Sections 1, 12, 13 and 24; Township 31 North, Range 6 West, Section 6—Lots 8, 9, 10, 11 and S/2, Sections 7, 18, 19, 20, 30; Township 31 North, Range 7 West, Section 1—Lots 5 through 8 and S/2, Section 9-S/2, and 10-S/2, Sections 11 through 16 and 19 through 36; Township 31 North, Range 8 West, Sections 25 and 36.

(ii) *Depth.* The Fruitland Formation is below the Kirtland Shale and Farmington Sandstone and above the Pictured Cliffs Formation. The average depth to the top of the Fruitland Formation underlying the Northeast Blanco Unit is 2,800 feet.

(33) *Cozzette Formation in Colorado.* RM79-76 (Colorado-12).

(i) *Delineation of formation.* The Cozzette Formation is located in the Piceance Creek Basin in Garfield County, Colorado, approximately 12 miles southwest of

the town of Glenwood Springs, Colorado. The formation consists of the following: Township 7 South, Range 90 West, 6th P.M., Sections 1 through 36; Township 7 South, Range 91 West, 6th P.M., Sections 1 through 36; and Township 8 South, Range 90 West, 6th P.M., Sections 1 through 12.

(ii) *Depth.* The Cozzette Formation is a member of the lower Mesaverde Group. The average depth to the top of the Cozzette Formation is 7,477 feet. Its base is defined as the top of the Corcoran Formation.

(34) *Corcoran Formation in Colorado.* RM79-76 (Colorado-12).

(i) *Delineation of formation.* The Corcoran Formation is located in the Piceance Creek Basin in Garfield County, Colorado, approximately 12 miles southwest of the town of Glenwood Springs, Colorado. The formation consists of the following: Township 7 South, Range 90 West, 6th P.M., Sections 1 through 36; Township 7 South, Range 91 West, 6th P.M., Sections 1 through 36; and Township 8 South, Range 90 West, 6th P.M., Sections 1 through 12.

(ii) *Depth.* The Corcoran Formation is a member of the lower Mesaverde Group. The average depth to the top of the Corcoran Formation is 7,677 feet. Its base is defined as the top of the Mancos Shale Formation.

(35) *Geopressured Wilcox Lobo Sandstone Formation in Texas.* RM79-76 (Texas-8).

(i) *Delineation of formation.* The Geopressured Wilcox Lobo Sandstone Formation is located in the southern part of Texas in Webb and Zapata Counties, Railroad District 4, and is located below the Lower Wilcox Group and above the Wills Point Formation which is part of the Midway Group.

(ii) *Depth.* The highest portion of the Geopressured Wilcox Lobo Sandstone Formation appears at 5,840 feet.

The approximate thickness varies from 1,175 feet in the north to 3,130 feet in the south.

(36) *The Travis Peak Formation in Texas.* RM79-76 (Texas-9) and (Texas-9 Addition).

(i) *Sym-Jac, West (Hosston) Field*—(A) *Delineation of formation.* The Travis Peak Formation in the Sym-Jac, West (Hosston) Field is found in Cherokee County, Texas, Railroad Commission District 6.

(B) *Depth.* The top and the base of the Travis Peak Formation in the Sym-Jac, West (Hosston) Field are found at approximately 9,850 feet and 12,050 feet, respectively, giving it a thickness of approximately 2,200 feet.

(ii) *Bear Grass Area*—(A)—*Delineation of formation.* The Travis Peak Formation in the Bear Grass area is found in portions of Freestone and Leon Counties, Texas, Railroad Commission District 5. The area is elliptical with a northeast/southwest major axis and contains approximately 5 square miles. The center of the area is approximately 2 miles east of the point of intersection of Freestone, Leon and Limestone Counties and is situated in portions of the following surveys: Gertrude Diaz A-178 and A-1276, Isaac Connelly A-117 and A-1152, William F. Gray A-296, L. W. Gideon A-1018 and Thomas Hardee A-1022.

(B) *Depth.* The top and the base of the Travis Peak Formation in the Bear Grass area are found at approximate subsea depths of —8,379 feet and —11,462 feet, respectively, giving a thickness of approximately 3,100 feet.

(iii) *Melrose, South (Travis Peak) Field.* (A) *Delineation of formation.* The Travis Peak Formation in the Melrose, South (Travis Peak) Field is located four miles south of the city of Melrose, southeastern Nacogdoches County, Texas Railroad Commission District 6, and is

within a 2.5 mile radius around the Texlan Oil Company, Inc. T.W. Baker No. 1 well.

(B) *Depth.* The top of the Travis Peak Formation is encountered at 8,920 feet and the base of the formation is at 9,940 feet (log depths).

(iv) *Martinsville (Travis Peak) Field*—(A) *Delineation of formation.* The designated portion of the Travis Peak Formation is located immediately south of the town of Martinsville in eastern Nacogdoches County, Texas, Railroad Commission District 6, and includes all of the area within a 2.5 mile radius around the Getty Oil Company, Manuel Herrara Well No. 1 located in the Jose Huerra Survey, A-289.

(B) *Depth.* The designated portion of the Travis Peak is found at sub-sea depths ranging from approximately 8,100 feet on the north to 8,500 feet on the south.

(v) [Reserved]

(vi) *Toolan (Travis Peak) Field*—(A)—*Delineation of formation.* The designated portion of the Travis Peak Formation consists of all or part of the surveys located in the Toolan Field, in portions of Nacogdoches and Rusk Counties, Texas, specifically the area encompassed by a 2.5 mile radius around Hill International Production Company's E. J. Edwards, *et al.*, No. 1 well, located approximately one mile southwest of the town of Garrison, Texas, Francis Kellett Survey, Abstract 329.

(B) *Depth.* These Travis Peak sands are found in the interval ±7,100 feet subsea to ±9,200 feet subsea, or from the base of the Pettit to the top of the Cotton Valley intervals.

(37) *Cotton Valley Sandstone Formation in Louisiana.* RM79-76-089 (Louisiana-3).

(i) *Delineation of formation.* The Cotton Valley Sandstone Formation is located in northern Louisiana. It is situated in all of Bienville, Bossier, Caddo, Caldwell, Clai-

borne, DeSoto, Franklin, Jackson, Lincoln, Natchitoches, Quachita, Red River, Sabine, Tensas, Union, Vernon, Webster and Winn Parishes and parts of Allen, Beauregard, Catahoula, Concordia, Grant, La Salle, Madison, Morehouse, Rapides and Richland Parishes. Certain portions of the Cotton Valley Sandstone Formation in the following fields are excluded from the designated area: Arkana, Athens, Beekman, Benton, Blackburn, Caddo-Pine Island, Cadeville, Calhoun, Cartwright, Cheniere, Cotton Valley, East Dykesville, East Haynesville, Greenwood-Waskom, Haynesville, Hico-Knowles, Lisbon, Longwood, Middlefork, Millhaven, Minden, North Carlton, Northeast Lisbon, North Missionary Lake, Plain Dealing, Ruston, Sentell, Shongaloo, Sligo, South Drew, South Downsville, Sugar Creek, Terryville, Tremont, Unionville and West Lisbon. Additional excluded areas that are not included in the fields are: Section 12, Township 19 North, Range 16 West; Sections 5 and 20, Township 21 North, Range 4 West; Sections 5 and 6, Township 21 North, Range 6 West; Section 30, Township 21 North, Range 7 West; Sections 28 and 32, Township 21 North, Range 11 West; Sections 30 and 32, Township 22 North, Range 4 West; Section 1, Township 22 North, Range 6 West; Section 34, Township 23 North, Range 2 East; Section 36, Township 23 North, Range 4 West; Sections 26, 34 through 36, Township 23 North, Range 6 West; Section 24, Township 23 North, Range 7 West; Section 9 and 29, Township 23 North, Range 9 West; and Section 28, Township 23 North, Range 15 West.

(ii) *Depth.* The Cotton Valley Sandstone Formation is defined as that interval encountered between the measured depths of 9,740 feet and 11,421 feet on the induction electrical log of the Phillips Petroleum Company—Martin B No. 1 Well located in Section 32, Township 11 North, Range 10 West, Natchitoches Parish, Louisiana.

(38) *Gray Sand, Reservoir A in Louisiana.* RM79-76 (Louisiana-4).

(i) *Delineation of formation.* The Gray Sand, Reservoir A, consists of interbedded sandstone, limestone and shale, and is found in the following portions of Lincoln and Claiborne Parishes, north Louisiana: T18N-R4W, Sections 3-6; T18N-R5W, Section 1; T19N-R4W, Sections 3-10, 15-23, 26-34; T19N-R5W, all Sections; T19N-R6W, Sections 1, 12, 13, 24, 25, 36.

(ii) *Depth.* The Gray Sand, Reservoir A, is defined as that sand occurring between the measured depths of 12,840 feet, and 13,350 feet on the induction log of the IMC Exploration Company—Eugene Tinsley *et al.* No. 1 Well located in Section 33, Township 19 North, Range 4 West, Lincoln Parish.

(39) *Basal Pennsylvanian Sand Formation in Alabama.* RM79-76 (Alabama-1).

(i) *Delineation of formation.* The Basal Pennsylvanian Sand Formation is found in Townships 14, 15, and 16 South, Ranges 2, 3, and 4 West, and Townships 15, 16, 17, and 18 South, Ranges 5, 6, and 7 West, in Jefferson, Walker and Tuscaloosa Counties, Alabama.

(ii) *Depth.* The Basal Pennsylvanian Sand Formation is a series of massive sand 300 to 600 feet thick, extending from the base of the Black Creek coal seam to the base of the Pennsylvanian series.

(40) *Dakota Formation in Colorado.* RM79-76 (Colorado-15).

(i) *Delineation of formation.* The Dakota Formation is found in Mesa, Garfield, and Rio Blanco Counties, Colorado, and consists of all or portions of Townships 3 through 8 South, Ranges 98 through 103 West, 6th P.M.

(ii) *Depth.* The depth to the top of the Dakota Formation ranges from 5,480 feet to 9,225 feet, and averages 6,993 feet. The base of the Dakota Formation is found at the top of the Cedar Mountain Sandstone Formation.

(41) *Ravencliff Formation in West Virginia.* RM79-76 (West Virgina-1).

(i) *Delineation of formation.* The Ravencliff Formation underlies portions of Fayette and Raleigh Counties, West Virginia.

(ii) *Depth.* The Ravencliff Formation lies below the Princeton Sandstone and above the Maxton Sandstone. The Ravencliff Formation ranges in thickness from thin sand stringers in the eastern portion of the two counties, to a maximum thickness of 140 feet in the central portion of the designated area.

(42) *Injun-Squaw Formation in West Virginia.* RM 79-76 (West Virginia-1).

(i) *Delineation of formation.* The Injun-Squaw Formation underlies portions of Fayette and Raleigh Counties, West Virginia.

(ii) *Depth.* The Injun-Squaw Formation lies below the Big Lime-Keener Formation and above the Weir Formation. The Injun-Squaw Formation ranges in thickness from a maximum of 20 feet in northwestern Fayette County, to thin stringers to the south and east.

(43) *Weir Formation in West Virginia.* RM79-76 (West Virginia-1).

(i) *Delineation of formation.* The Weir Formation underlies portions of Fayette and Raleigh Counties, West Virginia.

(ii) *Depth.* The Weir Formation lies approximately 200 feet below the Injun-Squaw Formation and approximately 200 feet above the Berea Formation. The Weir Formation ranges in thickness from 50 to 80 feet in the northeastern portion of the designated area, to 100 feet in the southern portion of the area.

(44) *Berea Formation in West Virginia.* RM79-76 (West Virginia-1).

(i) *Delineation of formation.* The Berea Formation underlies portions of Fayette and Raleigh Counties, West Virginia.

(ii) *Depth.* The Berea Formation lies approximately 200 feet below the Weir Formation. The Berea Formation ranges in thickness from 55 feet in northwestern Fayette County, to thin shaley sandstone stringers in the southern portion of designated area.

(45) *The Morrow Formation in Colorado.* RM79-76 (Colorado-10).

(i) *Delineation of formation.* The Morrow Formation is found in Kiowa County, Colorado. It is located north of the town of Lamar in southeastern Colorado, and underlies all of Township 18, South, Range 45 West, 6th p.m.

(ii) *Depth.* The Morrow Formation is defined as that formation occurring at an average measured depth of 4,500 feet.

(46) *Wasatch/Mesaverde Formation in Utah.* RM79-76 (Utah-1).

(i) *Delineation of formation.* The Wasatch/Mesaverde Formation is found in the Bitter Creek-Red Wash area in Uintah County, Utah, and is the general area of Township 7 South through 12 South, and Ranges 18 East through 25 East.

(ii) *Depth.* The average depth to the top of the Wasatch/Mesaverde Formation is 4,559 feet.

(47) *Fox Hills Formation in Wyoming.* RM79-76 (Wyoming-4).

(i) *Delineation of formation.* The Fox Hills Formation is found in Sweetwater County, Wyoming, in Township 16 North, Ranges 97 through 99 West; Township 17 North, Ranges 96 through 98 West; Township 17 North, Range 99 West, Sections 24 through 28 and 33

through 36; Township 18 North, Ranges 96 and 97 West; and Township 18 North, Range 98 West, Sections 24 through 26 and 34 through 36.

(ii) *Depth.* The Fox Hills Formation vertical limits are defined by the Lance Formation above and the Lewis Shale below. The average depth to the top of the Fox Hills Formation is 7,412 feet.

(48) *Edwards Limestone Formation in Texas.* RM79-76 (Texas-10).

(i) *Delineation of formation.* The Edwards Limestone Formation is encountered in the following named fields. These fields are found along the Gulf coast in the southeastern part of Texas in DeWitt, Karnes, and Lavaca Counties, Railroad Commission District 2.

DeWitt County: Yoakum (Edwards) Field

Karnes County: Kennedy, East (Edwards) Field

Lavaca County: Sweethome (Edwards) Field

Lavaca County: Word (Edwards) Field

Lavaca County: Word, North (Edwards) Field

Lavaca County: Yoakum (Edwards) Field

(ii) *Depth.* The top of the Edwards Limestone Formation, in the west, is at approximately 13,460 feet and the base is undetermined. In the east, the top of the formation is at an approximate depth of 13,150 feet and the base is at 14,500 feet resulting in a thickness of approximately 1,350 feet.

(iii) *Live Oak County*—(A) *Delineation of formation.* The Edwards Formation is found to the north of the City of Three Rivers in Live Oak County, Texas, Railroad Commission District 2. The designated area is bounded on the south by the Frio River and includes the following surveys: Mrs. M. D. Proctor A-904, A. E. Brown A-828, John Hefferman A-11, Bridget Haughey

A-9, Thos. Henry A-13, Partick Henry A-12, Simon Ryan A-35, Lewis Ayers A-2, Walter Henry A-15, Daniel O'Boyle A-32, Mark Killely A-20, S. M. & S. A. A-442, S. M. & S. A. A-443, Lawrence Jacobs A-659, and G. H. & H. R. R. A-205.

(B) *Depth.* The top of the Edwards Formation varies in depth from approximately 12,000 feet subsea on the eastern side of the designated area to 14,000 feet subsea on the west side.

(iv) *Karnes County*—(A) *Delineation of formation.* The Edwards Limestone Formation is located in Karnes County, Texas, Railroad Commission District 2. The designated area is all that portion of the Kennedy S.W. (Edwards) Field within the area encompassed by a circle 1.5 miles radially distant from and centered upon the Estelle Rolf Gas Unit No. 2, Well No. 2. The Estelle Rolf Gas Unit No. 2, Well No. 2 is located in the Carlos Martinez Survey A-6, Estelle Rolf lease, at a point 660 feet from the southwest leaseline and 1,250 feet from the southeast leaseline.

(B) *Depth.* The top of the designated portion of the Edwards Limestone Formation ranges from 12,500 feet 13,500 feet below sea level. The average depth of the top of the Edwards Limestone Formation in the designated area is 13,042 feet.

(49) *Upper Hosston Formation in Mississippi.* RM79-76 (Mississippi-1).

(i) *Delineation of formation.* The Upper Hosston Formation is found in the south half of Township 9 North, Range 19 West, Jefferson Davis County, Mississippi.

(ii) *Depth.* The top of the Upper Hosston Formation varies from 14,000 feet to 14,700 feet and the base of the formation is at approximately 15,900 feet.

(50) *The Rea Sand of the Mississippian Formation in Mississippi.* (Mississippi-2).

(i) *Delineation of formation.* The Rea Sand of the Mississippian Formation is found in portions of Township 16 South, Range 5 East; Township 17 South, Range 5 East; Township 16 South, Range 6 East; and Township 17 South, Range 6 East, in Clay County, Mississippi.

(ii) *Depth.* The Rea Sand of the Mississippian Formation occurs at depths ranging from 8,865 feet to 9,975 feet and varies in thickness from 30 feet to 160 feet.

(51) *The Mancos "B" Formation in Utah.* RM79-76 (Utah-2).

(i) *Delineation of formation.* The Mancos "B" Formation is found in the southeast Uinta Basin, underlying portions of Uintah and Grand Counties, Utah, in Township 13 South, Ranges 20 through 22 East, Sections 31 through 36; Township 13 South, Ranges 23 through 26 East, all Sections; Township 14 and 15 South, Ranges 20 through 26 East, all Sections; Township 15½ South, Ranges 23 through 25 East, Sections 31 through 36; Township 15½ South, Range 26 East, Sections 31 through 33; Township 16 South, Ranges 23 and 24 East, all Sections; Township 16 South, Range 25 East, Sections 1 through 12; and Township 16 South, Range 26 East, Sections 4 through 9.

(ii) *Depth.* The average depth to the top of the Mancos "B" Formation is 5,049 feet.

(52) *Frontier Formation in Wyoming.* RM79-76 (Wyoming-5).

(i) *Delineation of formation.* The Frontier Formation is located in Carbon County, Wyoming, in Township 14 North, Range 89 West, Sections 5 through 8, 17 through 20, 29 and 30; Township 14 North, Range 90 West, Sections 1 through 5, 8 through 17, and 21 through 28; Township 15 North, Range 89 West, Sections 18 through 20, and 29 through 32; all of Township 15 North, Range 90 West, excluding Sections 1 and 31; Township 15

North, Range 91 West, Sections 1 and 12; Township 16 North, Range 90 West, Sections 19, 20, and 28 through 34; and Township 16 North, Range 91 West, Sections 24, 25 and 36.

(ii) *Depth.* The top of the Frontier Formation is found at depths ranging from 5500 feet in the east to 7500 feet in the west, and averaging 6000 feet. The Frontier Formation is defined as that formation found immediately beneath the Carlisle Shale and immediately above the Mowry Shale.

(53) *Frontier Formation in Wyoming.* RM79-76 (Wyoming-7).

(i) *Delineation of formation.* The Frontier Formation is located in Lincoln, Sweetwater and Sublette Counties, Wyoming, in Townships 25 throught 28 North, Ranges 110 and 111 West; and Township 28 North, Range 112 West, Sections 1 through 4, 9 through 16, 21 through 28, and 33 through 36.

(ii) *Depth.* The Frontier Formation's vertical limits are defined by the Baxter Shale Formation above and the Mowry Shale Formation below. The depth to the top of the Frontier Formation varies from 9,000 to 10,500 feet.

(54) *The Bear River Formation in Wyoming.* RM 79-76 (Wyoming-6).

(i) *Delineation of formation.* The Bear River Formation is found in Lincoln, Sweetwater and Sublette Counties, Wyoming, in Townships 25 through 28 North, Ranges 110 and 111 West; and Township 28 North, Range 112 West, Sections 1 through 4, 9 through 16, 21 through 28, and 33 through 36.

(ii) *Depth.* The Bear River Formation's vertical limits are defined by the Mowry Shale Formation above and the Thermopolis Shale Formation below. The depth

to the top of the Bear River Formation varies from 9,400 feet to 11,200 feet.

(55) *The Medina Group in Pennsylvania.* RM79-76 (Pennsylvania-1).

(i) *Delineation of formation.* The Medina Group is found in Erie, Crawford, Mercer, Venango and Warren Counties, Pennsylvania.

(ii) *Depth.* The Medina Group is defined as that formation occurring within the Lower Silurian System between the Reynales Dolomite and the Queenston Shale, found at an approximate depth of 3,000 feet in the updip area, dipping to the southeast at approximately 50 feet per mile.

(56) *The Berea Formation in Virginia.* RM79-76 (Virginia-1).

(i) *Delineation of formation.* The Berea Formation is found in the Plateau Region of southwestern Virginia, an area including all of Dickenson County, and parts of Lee, Scott, Wise, Russell, Buchanan and Tazewell Counties, Virginia.

(ii) *Depth.* The thickness of the Berea Formation ranges from 20 feet to 125 feet, thickening toward the central portion of the Plateau Region. The depth to the top of the Berea Formation ranges from 3,365 feet in northern Buchanan County to 6,028 feet in eastern Buchanan County.

(57) *The Frio Formation in Texas.* RM79-76 (Texas-12).

(i) *Delineation of formation*—The Frio Formation is encountered in the LaSal Vieja (8 9680-9935) Field, located in the central portion of Willacy County, Texas Railroad District No. 4.

(ii) *Depth.* The top of the Frio Formation is located at approximately 9,635 feet below sea level and extends

to approximately 9,887 feet, giving it a maximum thickness of 252 feet.

(58) [Reserved]

(59) *Atoka Formation in Oklahoma.* RM79-76 (Oklahoma-1).

(i) *Delineation of formation.* The Atoka formation is found in Washita County, Oklahoma, in Township 9 North, Range 14 West, Sections 2 through 11; Township 9 North, Range 15 West, Sections 1 through 3, 11 and 12; Township 10 North, Range 14 West, Section 5 through 8, 17 through 21, and 27 through 35; Township 10 North, Range 15 West, Sections 6 through 30, 33 through 36; Township 10 North, Range 16 West, Sections 1 through 5, 8 through 14, 24 and 25; Township 11 North, Range 16 West, Sections 16, 20 through 22, 27 through 29, and 32 through 35.

(ii) *Depth.* The Atoka formation is defined as the uppermost sandstone development in the Atoka Series of the Lower Pennsylvania System which underlies the Cherokee/Red Fork Group and overlies the post-13 Finger Lime Shale. The average depth to the Atoka formation is approximately 14,800 feet.

(60) *The Dakota Formation in New Mexico.* RM79-76 (New Mexico-6).

(i) *Delineation of formation.* The Dakota Formation underlies portions of Townships 24 and 25 North, Ranges 7 through 10 West, in San Juan and Rio Arriba Counties, New Mexico. The producing interval of the Basin Dakota Field in the Dakota Formation is defined as beginning at the base of the Greenhorn Limestone, and extending to a point 400 feet below the base of the Greenhorn Limestone.

(ii) *Depth.* The average depth to the top of the Dakota Formation is 6,350 feet. The Dakota Formation

begins at the base of the Greenhorn Limestone and is 200 to 350 feet in gross thickness.

(61) *Sussex Formation in Colorado.* RM79-76 (Colorado-16).

(i) *Delineation of formation.* The Sussex Formation is found in Weld County, Colorado, in Township 4 North, Range 66 West, 6th P.M., Sections 2, 3, and 10, Section 11-N½, Section 15-W ½; Township 5 North, Range 66 West, 6th P.M., Sections 33, 34, and 35.

(ii) *Depth.* The average depth to the top of the Sussex Formation is 4,400 and 4,500 feet.

(62) *Pictured Cliffs Formation in New Mexico.* RM79-76 (New Mexico-7).

(i) *Delineation of formation.* The Pictured Cliffs Formation is found in the San Juan Basin and underlies portions of Townships 30 and 31 North, Ranges 7 and 8 West, and Township 31 North, Range 6 West, NMPM, in San Juan and Rio Arriba Counties, New Mexico.

(ii) *Depth.* The average depth to the top of the Pictured Cliffs Formation is approximately 3,200 feet. The thickness of the Pictured Cliffs Formation ranges from 150 to 250 feet.

(63) *The Wilcox Formation in Texas.* RM79-76 (Texas-11).

(i) *Aviators—N. (12,000) Field*—(A) *Delineation of formation.* The Wilcox Formation found in the area of the Aviators, N. (12,000) Field, Webb County, Texas, is within a 2.5 mile radius around the Pennzoil Producing Company No. 53-1 B.M.T.-Alice B. Hall well and covers approximately 19.6 square miles.

(B) *Depth.* The top of the Wilcox Formation, Aviators, N. (12,000) Field is at approximately —11,085 feet subsea and is 114 feet thick.

(ii) *Roma—W. (Wilcox 10,100) Field*—(A) *Delineation of formation.* The Wilcox Formation found in the area of the Roma, W. (Wilcox 10,100) Field, Starr County, Texas, is within a 2.5 mile radius around the Border Exploration Company No. 1 H. P. Guerra Jr., *et al.* well and is adjacent to the Rio Grande River.

(B) *Depth.* The top of the Wilcox Formation, Roma, W. (Wilcox 10,100) Field is at approximately 9,750 feet and extends to 10,750 feet, resulting in a total thickness of 1,000 feet.

(iii) *West Cole Field*—(A) *Delineation of formation.* The Wilcox Formation in the area of the West Cole Field, Webb County, Texas, is located approximately 36 miles east of the city of Laredo, Texas, and is within a 2.5 mile radius around the Forest Oil Corporation No. 1 Rosa V. de Benavides well.

(B) *Depth.* The top of the Wilcox Formation, West Cole Field, is at approximately 9,135 feet and extends to 10,315 feet (log depths) resulting in a total thickness of 1,180 feet.

(iv) *Taquachie Creek Field*—(A) *Delineation of formation.* The Wilcox Formation found in the area of the Taquachie Creek (Wilcox 11,162) Field, Zapata County, Texas, is located approximately 7 miles south of Mirando City, Texas, and is within a 2.5 mile radius around the Blocker Exploration Company No. 1-252 L. Amour Hinnant well.

(B) *Depth.* The top of the Wilcox Formation, Taquachie Creek (Wilcox 11,162) Field is log-measured at approximately 11,162 feet and extends to 11,200 feet, resulting in a total thickness of 38 feet.

(v) *Wilcox First Hinnant Formation in Jim Hogg County*—(A) *Delineation of formation.* The Wilcox First Hinnant Formation is located entirely within the northwestern portion of Jim Hogg County in south Texas,

Railroad Commission District 4, approximately 7 miles northeast of the city of Randado, Texas. The designated area is rectangular and begins at a point at the southwest corner of Section 164, C. Gutierrez Survey A-145, then due north 22,700 feet to a point in Section 98, E. L. Armstrong A-3 Survey (scaled 2,100 feet FWL and 1,800 feet FSL of Survey), then due west 32,200 feet to a point in Los Animos, Heirs of Felipe de la Pena Grant, A-244 (scaled 9,200 feet FSL and 24,500 feet FEL of said Grant), then due south 22,700 feet to a point scaled on the common boundary between Section 578, R. L. Robinson A-267, and Section 575, W. W. Ferguson A-104, being 6,000 feet south of the north line of the common north boundary of said Sections 578 and 575, then due east 32,200 feet to point of beginning, comprising 16,700 acres, or approximately 26 square miles.

(B) *Depth.* The top of the Wilcox First Hinnant Formation is encountered at 12,292 feet in the Edwin L. Cox and Berry R. Cox, Martinez No. 1 Well. The thickness reaches a maximum of 100 feet in the Northeast Thompsonville Field area, located 4½ miles northwest of the Cox Martinez No. 1 well. Downdip from the Northeast Thompsonville Field area, at the Cox Martinez No. 1 well, the sand has noticeably thinned and become shalier, with a total thickness of 58 feet.

(vi) *South Campana (Wilcox 10,400′) Field*—(A) *Delineation of formation.* The Wilcox 10,400′ Formation is located in the South Campana (Wilcox 10,400′) Field in McMullen and Duval Counties, in south Texas, Railroad Commission Districts 1 and 4, approximately 18 miles northeast of Freer, Texas. The designated area includes all of the acreage within a 2.5 mile radius around the ARCO H.C. Edrington I No. 33 well, which is located in the southeast quarter of Section 61, A. B. & M. Survey, Abstract 43, McMullen County, Texas.

(B) *Depth.* The average depth to the top of the Wilcox 10,400′ Formation is approximately 10,890 feet. The

subject formation averages from 10 to 12 feet in thickness within the geographical area.

(64) *Mesaverde Formation in Colorado.* RM79-76 (Colorado-17).

(i) *Delineation of formation.* The Mesaverde Formation is found in Garfield County, Colorado, in Township 6 South, Range 93 West, 6th P.M., Sections 3 through 10, 15 through 22, 27 through 34; Township 6 south, Range 94 West, 6th P.M., Sections 1 through 3, 7 through 36; Township 6 South, Range 95 West, 6th P.M., Sections 25 through 36; Township 7 South, Range 94 West, 6th P.M., Sections 1 through 9, 16 through 18; Township 7 South, Range 95 West, 6th P.M., Sections 1 through 24, 27 through 34; Township 7 South, Range 96 West, 6th P.M., Sections 1 through 36; Township 8 South, Range 96 West, 6th P.M., Sections 1 through 6.

(ii) *Depth.* The Mesaverde Formation is defined as that formation encountered between the base of the Wasatch Formation (Tertiary) and the top of the Mancos shale. The average depth to the top of the Mesaverde Formation is 4,475 feet.

(65) *The Upper Mancos Formation in Colorado.* RM79-76 (Colorado-20).

(i) *Delineation of formation.* The James Lime Formation is found in Rio Blanco County, Colorado, in Townships 2 and 3 South, Ranges 100 and 101 West, 6th P.M.

(ii) *Depth.* The Upper Mancos Formation is defined as being between the base of the Mesaverde Formation and the top of the Lower Mancos Formation. The average depth to the top of the Upper Mancos Formation is 1,800 feet.

(66) *Medina Group in New York.* RM79-76 (New York-1).

(i) *Delineation of formation.* The Medina Group is found in Chautauqua and Cattaraugus Counties, New York (and is equivalent to the U.S. Geological Survey's Albion Group). The Medina Group consists of the Grimsby Sandstone Formation, the Power Glen Shale Formation (also known as the Cabot Head Shale Formation), and, where present, the Whirlpool Sandstone Formation. The Medina Group is bounded by the overlying Thorold Formation, where present. Where the Thorold Formation is not present, the Medina group is overlaid by the Reynales Limestone Formation (also known as the "Packer Shell"). The Queenston Shale Formation is the underlying boundary of the Medina Group. Excluded from the delineated Medina Group are any Medina gas storage areas, including buffer zones, or any area within "existing" Medina fields that have been substantially developed absent an incentive price.

(ii) *Depth.* The average depth to the top of the Medina Group is approximately 3,850 feet with a range to the top of the formation of 1,700 to 6,000 feet. The average pay thickness of the formation is 55 feet.

(67) *Morrison Formation in Utah.* RM79-76 (Utah-4).

(i) Delineation of formation. The Morrison formation is found is the Book Cliffs area of Grand, Emery, and Uintah Counties, Utah, in the area of Townships 15 South through 20 South, and Ranges 17 East through 24 East.

(ii) *Depth.* The average depth to the top of the Morrison Formation is 6.315 feet. The Morrison Formation averages 600 feet in thickness with the vertical limits defined by the Dakota Formation above and the Entrada Formation below.

(68) *Smackover C Zone in Louisiana.* RM79-76-221 (Louisiana 5 and 5 Addition).

(i) *Delineation of formation.* The Smackover C Zone is found within the East Dykesville Field in Claiborne and Webster Parishes, Louisiana, in the area of Township 22 North, Range 8 West, Sections 3-10, 15-18; Township 22 North, Range 9 West, Sections 1-18; Township 23 North, Range 8 West, Sections 30-34; and Township 23 North, Range 9 West, Sections 25-36.

(ii) *Depth.* The Smackover C Zone occurs between the measured depths of 11,290 feet and 11,340 feet on the induction electrical log of the Wheless Industries—Pelto Oil—Guy Lewis *et al.* No. 1 well and between 11,534 feet and 11,568 on the electric log of the Cities Service Oil and Gas Corporation—Hearn No. 1 well.

(69) *James Lime Formation in Louisiana* RM79-76 (Louisiana-6).

(i) *Delineation of formation.* The James Lime Formation is found in the Benson Field in the southern portion of De Soto Parish, Louisiana, in the area of Township 10 North, Range 13 West, Sections 1-18; Township 10 North, Range 14 West, Sections 1-18; Township 11 North, Range 13 West, Sections 1-36; and Township 11 North, Range 14 West, Sections 1-36.

(ii) *Depth.* The top of the James Lime Formation is encountered at approximately —5,072 feet subsea in the northwest portion and at approximately —5,400 feet subsea in the southern portion. It is situated directly below the Bexar Formation and above the Pine Island Formation. The maximum thickness of the formation is approximately 260 feet.

(70) *Wolfcamp Formation in Texas.* RM79-76 (Texas-14).

(i) *Wolfcamp Formation in the Gomez,* NW. (Wolfcamp) Fields—(A) *Delineation of Formation.* The specific areas of the Wolfcamp Formation are found in (*1*) the Gomez, NW. (Wolfcamp) Field, in northern Pecos

County northwest of Fort Stockton, Texas, underlying approximately 24,457 acres, and in (*2*) the Wolf (Wolfcamp) Field, in the extreme southwestern portion of Loving County, between the town of Mentone, Texas, and the Pecos River in Sections 78-82, Block 33, H&TC RR Company Survey.

(B) *Depth.* The top and base of the Wolfcamp Formation are encountered at the approximate depths of 11,384 feet and 11,720 feet, respectively, in the Gomez, N.W. (Wolfcamp) Field, and at the approximate depths of 10,118 feet and 10,696 feet, respectively, in the Wolf (Wolfcamp) Field.

(ii) *Wolfcamp Formation in Sutton County*—(A) *Delineation of Formation.* The Wolfcamp Formation is found in Sutton County, Texas, Railroad Commission District 7C. The designated area consists of Sections 50, 51, 55, 56, 57, and 77, Blocks B, H. E. & W. T. RR Survey.

(B) *Depth.* The Wolfcamp Formation in the designated area lies at a subsea depth of approximately 2,400 feet, with an approximate thickness of 1,270 feet. The Wolfcamp Formation in the designated area is defined as that interval found between the log depths of 3,530 feet to 4,800 feet in the William Perlman Fields 50 No. 1 well.

(71) *Niobrara Formation in Nebraska,* RM79-76 (Nebraska—1).

(i) *Delineation of formation.* The Niobrara Formation is found in all of Chase, Deuel, Dundy, Hitchcock, Keith, Lincoln and Perkins Counties, the western half of Frontier County (Townships 5 through 8 North, Ranges 27 through 30 West), the eastern half of Cheyenne County (Townships 12 through 17 North, Ranges 46 through 49 West), and the southern most third of Garden County (Townships 15 through 19 North, Ranges 41 through 46 West), Nebraska.

(ii) *Depth.* The Niobrara Formation underlies the Pierre Shale Formation and overlies the Fort Hays Limestone Formation. The depth to the top of the Niobrara Formation ranges from 900 to 4,000 feet and averages 2,450 feet.

(72) *Frontier Formation in Wyoming.* RM79-76 (Wyoming-8).

(i) *Delineation of formation.* The Frontier Formation is found in Lincoln, Sublette, and Sweetwater Counties, Wyoming, encompassing all or parts of Townships 25 and 26 North, Range 109 West; Townships 29 North, Range 111 West; Townships 26 through 31 North, Range 112 West; and Townships 28 through 31 North, Range 113 West.

(ii) *Depth.* The Frontier Formation's vertical limits are defined by the Baxter Shale Formation above the Mowry Shale Formation below. The gross thickness of the formation varies from 50 to 150 feet. The average depth to the top of the Frontier Formation is 7,700 feet.

(73) *Massive "A" Sand Formation in Texas.* RM79-76 (Texas-17).

(i) *Delineation of formation.* The Massive "A" Sand Formation is found in the Chapa, East Field in southwestern Live Oak County, Texas, Railroad Commission District 2. The formation is described by a 2.5 mile radius around the Aminoil USA, Inc., El Paso Natural Gas No. 5 well located in Section 299, Hooper & Wade A-250 Survey, approximately 4 miles east of the McMullen County line.

(ii) *Depth.* The average depth to the top of the Massive "A" Sand Formation is approximately 11,600 feet and the thickness varies from 220 feet in the northwest to 560 feet in the southeast.

(74) *Navarro Formation in the Laredo Field in Texas.* RM79-76 (Texas-13).

(i) *Delineation of formation.* The Navarro Formation in the Laredo Field is found in Webb County, Texas, Railroad Commission District 4.

(ii) *Depth.* The depth to the top of the Navarro Formation in the Laredo Field is approximately —7,227 feet (subsea) in the northwest portion of the area. The base of the Navarro Formation is found at —7,735 feet (subsea) in the southeastern portion of the area. The maximum thickness of the Navarro Formation is approximately 28 feet.

(75) *The Dakota Formation in Colorado.* RM79-76 (Colorado-18).

(i) *Delineation of formation.* The Dakota Formation underlies portions of Townships 32, 33 and 34 North (South of Ute Line), Ranges 6 through 11 West, in La Plata and Archuleta Counties, Colorado, and it is within the Ignatio-Blanco Field.

(ii) *Depth.* The Dakota Formation is below the Graneros Shale and above the Morrison Formation. The average depth to the top of the Dakota Formation is 7,950 feet. The formation is approximately 225 to 250 feet in thickness.

(76) *Mesaverde Formation in Colorado.* RM79-76 (Colorado-19).

(i) *Delineation of formation.* The Mesaverde Formation underlines Townships 32, 33 and 34 North (South of Ute Line), Ranges 6 through 11 West, in La Plata and Archuleta Counties, Colorado. The formation is within the Ignacio-Blanco Field.

(ii) *Depth.* The Mesaverde Formation is below the Lewis Shale Formation and above the Mancos Shale Formation. The average depth to the top of the Mesaverde Formation is 5,380 feet. The formation is approximately 900 feet in thickness.

APPENDIX

R6W T32N: Sections 5 S½, 6, 7, 8 W½, 10 W½, 12 S½, 13 S½, 14 N½, 15 W½, 16, 17 W½, 18, 19, 20 W½, 24 E½ and E½ of W 42.

R7W T32N: Sections 1-16, 17 N½, 18-22, 23 W½, 24 E½ and E½ of W½.

R7W T33N: Sections 7 E½, 8 S½, 15, 16 S½, 17 N½, 18 W½, 19 W½, 21, 22 N½, 23 S½, 25 S½, 26, 27 W½, 28 W½, 19 W½, 30-33, 34 E½, 35 and 36.

R8W T32N: Sections 1-3, 4 N½, 5, 6 W½, 9 E½, 10 E½, 11-14, 15 E½, 17 S½, 18, 19 W½, and W½ of E½, 22 E½ of E½, 23 and 24.

R8W T33N: Sections 1, 2, 3 S½, 4 S½, 5-9, 10 S½, 11 S½, 15-23, 24 S½, and 25-36.

R9W T32N: Sections 1 N½, 2 S½, 3 S½, 4 S½, 5 E½, 6-9, 10 S½, 11 S½, 13 N½, 15 W½, 16, 17, 18 E½, 19 W½, and W½ of E½.

R9W T33N: Sections 1 N½, 2 S½, 3 N½, 4-14, 15 W½, 17-20, 22, 23 S½, 24 W½, 25-28, 29 E½, 30, 31, 32 W½ 33, 34 S½, 35, and 36 W½.

R9W T34N: Sections 19 W½, 29 E½, 30 through 32, 33 W½.

R10W T32N: Sections 1, 2, 3 E½, 4 S½, 5 N½, 6 N½, 7, 8, 9 N½, and 10-24.

R10W T33N: Sections 1 W½ 2, 3, 4 S½, 5 S½, 6, 8, 9 W½, 10-15, 21 W½, 22 S½, 23, 24, 25 E½, 26, 27, 28 S½, 29 S½, 30 E½, 31 E½, 32 and 34-36.

R10W T34N: Sections 24 S½, 25, 26 E½, 27 S½, 28 S½, 31 S½, 32 N½, 33 N½, 34, 35 E½ and 36.

R11W T32N: Sections 1, 10-16, 18 S½, and 19-24.

R11W T33N: Sections 14 N½, 25 E½, 27 E½, and 34 S½.

(77) *Frontier Formation in Wyoming.* RM79-76 (Wyoming-9).

(i) *Delineation of formation.* The Frontier Formation is found in Sweetwater County, Wyoming, in Townships 23, 24 and 25 North, Ranges 101 and 102 West; Townships 24, 25 and 26 North, Range 103 West; and Townships 24 and 25 North, Range 104 West.

(ii) *Depth.* The Frontier Formation is defined as being between the base of the Baxter Formation and the top of the Mowry Formation. The average depth to the top of the Frontier Formation is 9,500 feet.

(78) *Frontier Formation in Wyoming.* RM79-76 (Wyoming-10).

(i) *Delineation of formation.* The Frontier Formation is found in Sweetwater and Lincoln Counties, Wyoming, and encompasses Township 24 North, Range 114 West, Sections 1 and 12; Township 25 North, Ranges 112 and 113 West; Townships 26 North, Range 112 West, Sections 4, 9, 16 and 19-36; and Township 26 North, Range 113 West, Sections 25-36.

(ii) *Depth.* The vertical limits of the Frontier Formation are defined by the Baxter Shale above and the Mowry Shale below. The gross thickness of the formation averages between 200 and 250 feet, and the average depth to the top of the Frontier Formation is 8,500 feet.

(79) *The Lewis Formation in Wyoming.* RM79-76 (Wyoming-11).

(i) *Delineation of formation.* The Lewis Formation is found in Carbon and Sweetwater Counties, Wyoming, encompassing all or parts of:

Townships 21 and 22 North, Range 89 West

Townships 19 through 25 North, Range 90 West

Townships 13, 14, 18 through 21, and 23 through 25 North, Range 91 West

Townships 13 through 21 and 23 through 25 North, Range 92 West

Townships 13 through 25 North, Range 93 West

Townships 12 through 25 North, Range 94 West

Townships 12 through 25 North, Range 95 West

Townships 12 through 26 North, Range 96 West

Townships 12 through 26 North, Range 97 West

Townships 12 through 17 and 22 through 26 North, Range 98 West

Townships 12 through 16 and 22 through 26 North, Range 99 West

Townships 14 through 16 and 23 through 26 North, Range 100 West

(ii) *Depth.* The Lewis Formation's vertical limits are defined by the Fox Hills Formation above, or in the case where the Fox Hills Formation is not present, the Lance Formation above, and the Mesa Verde Formation below. The average depth to the top of the Lewis Formation is 7,800 feet.

(80) *Nugget Formation in Wyoming.* RM79-76 (Wyoming-12).

(i) *Delineation of formation.* The Nugget Formation is found in Carbon County, Wyoming, in Township 21 North, Range 79 West, Sections 3 through 10, and 15 through 18; and Township 22 North, Range 79 West, Sections 31 through 34.

(ii) *Depth.* The vertical limits of the Nugget Formation are the Basal Sundance Formation above and the Chugwater Formation below. The average depth to the top of the Nugget Formation is 11,690 feet.

(81) *Mesaverde Formation (including the Rollins Member) in Colorado.* RM79-76 (Colorado-22).

(i) *Delineation of formation.* The Mesaverde Formation is located in the southeast portion of the Piceance Basin in Garfield, Mesa, Delta, Pitkin and Gunnison Counties, Colorado, approximately 15 miles northeast of the city of Grand Junction, Colorado. The Mesaverde Formation underlies Townships 6 through 11 South, Ranges 89 through 97 West, 6th P.M., with certain specified exclusions.

(ii) *Depth.* The Mesaverde Formation varies in thickness from zero to approximately 6,000 feet with its base defined as the bottom of the Rollins Members. The average depth to the top of the Mesaverde Formation is 5,641 feet.

(82) *Cozzette Formation in Colorado.* RM79-76 (Colorado—22).

(i) *Delineation of formation.* The Cozzette Formation is located in the southeast portion of the Piceance Basin in Garfield, Mesa, Delta, Pitkin and Gunnison Counties, Colorado, approximately 15 miles northeast of the city of Grand Junction, Colorado. The Cozzette Formation underlies Townships 6 through 11 South, Ranges 89 through 97 West, 6th P.M., with certain specified exclusions.

(ii) *Depth.* The Cozzette Formation is a member of the Upper Mancos Formation. The average depth to the top of the Cozzette Formation is 6,869 feet.

(83) *Corcoran Formation in Colorado.* RM79-76 (Colorado—22).

(i) *Delineation of formation.* The Corcoran Formation is located in the southeast portion of the Piceance Basin in Garfield, Mesa, Delta, Pitkin and Gunnison Counties, Colorado, approximately 15 miles from the city of Grand Junction, Colorado. The Corcoran Formation underlies Townships 6 through 11 South, Ranges 89 through 97, West, 6th P.M., with certain specified exclusions.

(ii) *Depth.* The Corcoran Formation is a member of the Upper Mancos Formation. The average depth to the top of the Corcoran Formation is 7,069 feet.

APPENDIX—AREAS NOT COVERED BY THE TIGHT FORMATION DESIGNATION IN DOCKET NO. RM79-76 (COLORADO—22)

(1) The area designated by the Commission as a tight formation in Docket No. RM79-76 (Colorado—5), Order No. 148, under § 271.703 for the Rollins, Corcoran and Cozzette Formation.

(2) Township 10 South, Range 95 West, 6th P.M., Sections 17, 18, 19, 30, and Township 10 South, Range 96 West, 6th P.M., Sections 12, 13, 23 through 28, 33m for the Rollins, Cozzette and Corcoran Formations. (Infill Drilling)

(3) Township 9 South, Range 97 West, 6th P.M., Sections 1 through 24, 26 through 35, and Township 10 South, Range 97 West, 6th P.M. Sections 2 through 11, for the Cozzette and Corcoran. (Designated in Order No. 151, Docket No. RM79-76 (Colorado—9))

(4) The area designated in Docket No. RM79-76 (Colorado—12) Order No. 156, under § 271.703 for the Cozzette, and Corcoran.

(5) Township 6 South, Range 93 West, 6th P.M. Sections 5, 6, 7, 8, 17, 18, 19, 20, and Township 6 South, Range 94 West, 6th P.M. Sections 1, 2, 3, 8 through 17, 19 through 24, 27 through 33, for the Mesaverde Formation. (Designated in Order No. 205, Docket No. RM79-76 (Colorado—17))

(6) The Wolf Creek Unit area. (Storage)

(84) *Berea Sandstone and the "Second Berea" zone of the Bedford Shale in Ohio.* RM79-76 (Ohio-2) and RM79-76-177 (Ohio-2 Addition).

(i) *Delineation of formation.* The Berea Sandstone and the "Second Berea" zone of the Bedford Shale occur within the Lower Mississippian System. The Berea Sandstone (also called the "First Berea" or "Berea Grit") lies above the Bedford Shale, which includes the "Second Berea" zone near its base. The Berea Sandstone is found in the following townships:

Athens County: Alexander, Ames, Athens, Bern, Canaan, Carthage, Dover, Lodi, Rome, Troy.

Belmont County: Somerset, Washington, Wayne, York.

Gallia County: Addison, Cheshire, Gallipolis, Springfield (Sections 1 through 12).

Meigs County: all except Columbia.

Monroe County: all.

Morgan County: all.

Muskingum County: Blue Rock, Meigs, Rich Hill, Salt Creek, Wayne (Sections 29 and 32).

Noble County: all.

Perry County: Bearfield (Sections 1, 2, 3, 10 through 15, 22 through 27).

Washington County: all

The "Second Berea" zone of the Bedford Shale is found in the following townships:

Athens County: Alexander, Ames, Athens, Bern, Canaan, Carthage (Sections 25, 26, 29 through 36, Fractions 24, 32 through 35), Dover, Lodi, Rome.

Gallia County: Addison, Cheshire, Gallipolis, Springfield (Sections 1 through 12).

Meigs County: Bedford (All sections except 1 through 4), Orange (Sections 35 and 36), Rutland, Salem, Salisbury, Scipio.

Morgan County: Bloom, Bristol, Deerfield, Homer, Malta, Marion, Meigsville (Sections 5, 6, 7, 8, 18, 19), Morgan, Penn, Union, York.

Muskingum County: Blue Rock, Meigs, Rich Hill, Salt Creek, Wayne (Sections 29 and 32).

Perry County: Bearfield (Sections 1, 2, 3, 10 through 15, 22 through 27).

Washington County: Wesley (Section 6).

(ii) *Depth.* The vertical limits of the designated interval are defined by the base of the Sunbury Shale (called "Coffee Shale" by drillers) above and the top of the Upper Devonian Ohio Shale below. The depth to the top of the interval ranges from approximately 1,000 feet to 2,400 feet. The Berea Sandstone ranges from 10 to 54 feet in thickness, and the "Second Berea" zone of the Bedford Shale has a maximum thickness of 36 feet. The "Second Berea" is separated from the Berea Sandstone by approximately 10 to 50 feet of red to gray shales and siltstones.

(85) *Chacra Formation in New Mexico.* RM79-76 (New Mexico-10).

(i) *Delineation of formation.* The Chacra Formation is found in Township 21 North, Range 5 West, Sections 6, 7, 8, 16 through 22 and 26 through 36; Township 21 North, Range 6 West, Sections 1 through 18, 20 through 27, 35 and 36; Township 21 North, Range 7 West, Sections 1 through 4, and 10 through 13; Township 22 North, Range 6 West, Sections 6, 7, 8, 16 through 22, and 26 through 36; and Township 22 North, Range 7 West, Sections 1 through 36, NMPM in Sandoval County, New Mexico. The formation is on the Chaco Slope of the Southern San Juan Basin.

(ii) *Depth.* The Chacra Formation averages 300 feet in thickness and is the uppermost sand formation below

the Huerfanito bentonite bed. The average depth to the top of the Chacra Formation is 1,658 feet.

(86) *Mesaverde Formation in Colorado.* RM79-76 (Colorado—24).

(i) *Delineation of formation.* The Mesaverde Formation is found in the southwestern portion of Rio Blanco County, Colorado, about 70 miles northwest of the town of Grand Junction. The Mesaverde Formation is located in Township 1 South, Ranges 98 and 99 West, 6th P.M., all; Township 1 South, Range 100 West, 6th P.M. Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36; Township 2 Range 98 West, 6th P.M., Sections 4 through 8; Township 2 South, Range 99 West, 6th P.M., Sections 1 through 12, 15 through 22, and 27 through 34; and Township 2 South, Range 100 West, 6th P.M., Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36.

(ii) *Depth.* The Mesaverde Formation varies in thickness from 2,900 to 3,600 feet. The average depth to the top of the Mesaverde Formation is 6,693 feet.

(87) *Mancos Formation in Colorado.* RM79-76 (Colorado—24).

(i) *Delineation of formation.* The Mancos Formation is found in the southwestern portion of Rio Blanco County, Colorado, about 70 miles northwest of the town of Grand Junction. The Mesaverde Formation is located in Township 1 South, Ranges 98 and 99 West, 6th P.M., all; Township 1 South, Range 100 West, 6th P.M., Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36; Township 2 Range 98 West, 6th P.M., Sections 4 through 8; Township 2 South, Range 99 West, 6th P.M., Sections 1 through 12, 15 through 22, and 27 through 34; and Township 2 South, Range 100 West, 6th P.M., Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36.

(ii) *Depth.* The Mancos Formation is approximately 5,000 feet thick. The average depth to the top of the Mancos Formation is 9,495 feet.

(88) *Dakota Formation in New Mexico.* RM79-76 (New Mexico—8).

(i) *Delineation of formation.* The Dakota Formation is found in Townships 30 and 31 North, Ranges 2 through 7, in San Juan and Rio Arriba Counties, New Mexico. The formation is within the Basin-Dakota Gas Pool, in the Rosa Area of the San Juan Basin.

(ii) *Depth.* The Dakota Formation is below the Graneros Shale Formation and above the Morrison Formation. The average depth to the top of the Dakota Formation is 7,950 feet. The formation is approximately 250 feet in thickness.

(89) *Pictured Cliffs Formation in New Mexico.* RM79-76-108 (New Mexico—11).

(i) *Delineation of formation.* The Pictured Cliffs Formation is found in the southeastern portion of the San Juan Basin in Rio Arriba County, New Mexico. The area is divided into two non-contiguous tracts described as Area A and Area B. Area A encompasses Township 25 North, Range 6 West, Sections 21, 22, 23, 26, 27, 28 NE/4, 34, 35, and 36 W/2. Area B encompasses Township 25 North, Range 7 West, Sections 4, 5 E/2, 8 NE/4, 9 N/2, and 10 N/2; Township 26 North, Range 6 West, Section 31; Township 26 North, Range 7 West, Sections 17 S/2, 18, 19 N/2, and SE/4, 20, 21, S/2, 22 S/2, 25 SW/4, 26 S/2, 27, 28, and 33 through 36.

(ii) *Depth.* The Pictured Cliffs Formation's vertical limits are defined by the Fruitland Formation above and the Lewis Shale Formation below. The average thickness through the formation is 70 feet, and the average depth to the top of the Pictured Cliffs Formation is 2,387 feet.

(90) *Hartselle Sandstone Formation in Alabama.* RM79-76-096 (Alabama—2).

(i) *Delineation of formation.* The Hartselle Sandstone Formation in Alabama is found in Township 11 South, Ranges 7 to 9 West and Township 12 South, Ranges 6 to 10 West, in Winston County, and in Townships 12 to 17 South, Ranges 4 to 10 West, in Walker County. The Jasper Field located in Township 13 South, Range 7 West, Sections 21 through 28, and 33 through 36, in Walker County, is excluded from the designation.

(ii) *Depth.* The depth of the formation varies from approximately 400 feet in the northern part of the formation, to 3,000 feet in the southern part. It varies in thickness from zero feet at the downdip pinchout in southern Walker County and along the western border of Walker County, to over 150 feet in northern Walker County and southern Winston County.

(91) Vicksburg (9000′) Formation in Texas. RM79-76 (Texas—20).

(i) *Monte Christo Vicksburg 9000′ Formation*—(A) *Delineation of formation.* The Monte Christo Vicksburg 9000′ Formation is located in a portion of Hidalgo County, Texas, and is encountered in portions of the following surveys: Jackson Subdivision of the San Salvadore Del Tule Grant, Juan Jose Balli Survey A-290; Section 203, Tex.-Mex. Ry. Co. Survey A-124; Section 206 Tex.-Mex. Ry. Co. Survey A-637; Section 207, Tex.-Mex. Ry. Co. Survey A-126; Section 210, W. T. Bomar Survey A-624; Section 211, Tex.-Mex. Ry. Co. Survey A-128; Section 214; Macedonia Vela, Jr. Survey A-623. Excluded from the designation is a rectangular area in the Juan Jose Balli Survey A-290, two sides of which extend due north and south, the north line being 750′ north of and the west line being 750′ west of the Shell Oil Co Bright & Schiff Hamman #1 Well, and the south side being 750′ south of the east line being 750′ east of the Shell Oil Co. Bright & Hamman #2 Well.

(B) *Depth.* The Monte Christo Vicksburg 9000′ Formation ranges from a depth of approximately 9000 feet to approximately 9700 feet, with a gross average thickness of approximately 650 feet. The bottom of the formation may extend as deep as 10,400 feet in the undeveloped areas.

(ii) *Monte Christo, South (9000′) Formation*—(A) *Delineation of formation.* The Monte Christo, South (9000′) Formation is located in the southern portion of Hidalgo County, Texas, Railroad Commission District 4. The designated area includes the following surveys: Macedonia Jr. Vela No. 214, A-623; Tex.-Mex. R.R. No. 215, A-130; W. T. Bomar No. 218, A-626; Jas. L. Hudson, A-649; Walter A. Hoffhein, A-797; W. H. Kozel, A-798; Tex.-Mex. R.R. No. 217, A-131; the northernmost 500 acres of both the Nicolas Zamora Porcion No. 48, A-76 and the Torebio Zamora Porcion No. 49, A-78; and the southernmost 900 acres of the northern 1,800 acres of the Francisco Cantu Porcion No. 80, A-570.

(B) *Depth.* The top of the Monte Christo, South (9000′) Formation varies from 8,750 feet subsea to 9,600 feet subsea. The maximum thickness of the formation is 1,030 feet.

(92) *James Limestone Formation in Texas.* RM79-76-172 (Texas-21).

(i) *Southern Shelby and Northern San Augustine Counties*—(A) *Delineation of formation.* The James Limestone Formation is found in northern San Augustine County and southern Shelby County, in Railroad District No. 6 in Texas. The area includes 67,900 acres surrounding and extending northwest of the city of San Augustine, Texas.

(B) *Depth.* The top of the James Limestone Formation ranges from —6,700 feet subsea in the north to —7,750 feet subsea in the south, with a thickness of approximately 202 feet.

(ii) *Shelby County*—(A) *Delineation of Formation.* The James Limestone Formation is located in Shelby County, Railroad Commission District 6, East Texas. The James Limestone Formation is included as a subdivision of the Trinity Group of Lower Cretaceous (Commanchean) Age.

(B) *Depth.* The James Limestone Formation ranges from approximately —5,100 feet subsea in the North to —6,700 feet subsea in the south. The James Limestone overlies the Pine Island Shale and underlies the Bexar Shale.

(93) *Berea Sandstone in Kentucky.* RM79-76-113 (Kentucky—1).

(i) *Delineation of formation.* The Berea Sandstone is delimited by the underlying Ohio Shale of Devonian age, also known as "Devonian Shale" or "Cinnamon" (drillers' terms), and by the overlying Sunbury Shale of Mississippian age, also known as "Coffee Shale" (drillers' term). The Berea Sandstone is also known as "grit" or "Bedford Shale" (drillers' terms) in the designated area, and is used as a marker for the base of the Mississippian age deposits. The designated area includes all of Lawrence County, Kentucky, with the exception of two areas encompassing approximately three square miles near the 38th parallel in the south-central part of the county.

(ii) *Depth.* The average depth to the top of the Berea Sandstone is 1,400 feet, and the interval is about 100 feet thick throughout Lawrence County.

(94) *Lance Formation in Wyoming.* RM79-76-112 (Wyoming—13)

(i) *Delineation of formation.* The Lance Formation is located in Fremont and Natrona Counties, Wyoming, in Township 38 North, Range 88 West, Sections 3 through 11, 13 through 36; Township 38 North, Range

89 West; Township 38 North, Range 90 West, Sections 1 through 3, 6 through 36; Township 38 North, Range 91 West; Township 38 North, Range 92 West, Sections 1, 2, 11 through 14, 23, 24, 25; Township 39 North, Range 88 West, Sections 19, 29 through 33; Township 39 North, Range 89 West, Sections 4 through 10, 13 through 36; Township 39 North, Range 90 West, Sections 1 through 32, 36; Township 39 North, Range 91 West; Township 39 North, Range 92 West, Sections 12, 13, 14, 23 through 26, 35 and 36.

(ii) *Depth.* The Lance Formation lies between the base of the Lower Fort Union Formation and the top of the Meeteetse Formation. The average depth to the top of the Lance Formation is 8,915 feet.

(95) *Meeteetse Formation in Wyoming.* RM79-76-112 (Wyoming—13).

(i) *Delineation of formation.* The Meeteetse Formation is located in Fremont and Natrona Counties, Wyoming, in Township 38 North, Range 88 West, Sections 3 through 11, 13 through 36; Township 38 North, Ranges 89, 90 and 91 West; Township 38 North, Range 92 West, Sections 1, 2, 11 through 14, 23, 24, 25; Township 39 North, Range 88 West, Sections 19, 29 through 33; Township 39 North, Range 89 West, Sections 4 through 10, 13 through 36; Township 39 North, Ranges 90 and 91 West; Township 39 North, Range 92 West, Sections 12, 13, 14, 23 through 26, 35 and 36.

(ii) *Depth.* The Meeteetse Formation lies between the base of the Lance Formation and the top of the Mesaverde Formation. The average depth to the top of the Meeteetse Formation is 14,319 feet.

(96) *Mesaverde Formation in Wyoming.* RM79-76-112 (Wyoming—13).

(i) *Delineation of formation.* The Mesaverde Formation is located in Fremont and Natrona Counties, Wyo-

ming, in Township 38 North, Range 89 West, Sections 6, 7; Township 38 North, Range 90 West, Sections 1 through 12, 15 through 18; Township 38 North, Range 91 West, Sections 2, 3, 4, 9 through 12; Township 39 North, Range 90 West, Sections 28 through 36; Township 39 North, Range 91 West, Sections 25, 26, 34, 35, 36.

(ii) *Depth.* The Mesaverde Formation lies between the base of the Meeteetse Formation and the top of the Cody Shale Formation. The average depth to the top of the Mesaverde Formation is 15,396 feet.

(97) *Mesaverde Formation in New Mexico.* RM79-76-109 (New Mexico—12).

(i) *Delineation of formation.* The Mesaverde Formation is located in San Juan County, New Mexico, and is found in Township 32 North, Range 8 West, NMPM, Sections 30 and 31 and Township 32 North, Range 9 West, NMPM, Sections 25, 26, 27, 34 and 35.

(ii) *Depth.* The Mesaverde Formation is within the Blanco Mesaverde Gas Pool in the San Juan Basin, and consists of three Sand areas; the Cliffhouse member, which averages 50 feet in thickness, the Menefee member, which ranges in thickness from 230 feet to 290 feet, and the Point Lookout member which ranges in thickness from 150 feet to 200 feet. The vertical limits of the Mesaverde Formation are from the Huerfanito Bentonite in the Lewis Shale above, to a point 500 feet below the top of the Point Lookout member. The average depth to the top of the Mesaverde Formation is 5,463 feet.

(98) *Permo-Penn Formation in New Mexico.* RM79-96-110 (New Mexico—13).

(i) *Delineation of formation.* The Permo-Penn Formation is located in Eddy County, New Mexico, in Township 17 South, Ranges 24 through 26 East; Township 18 South, Ranges 24 and 25 East; Township 19 South, Ranges 23 through 25 East; Township 20 South, Ranges

21, 23, and 24 East; Township 20 ½ South, Ranges 21 and 22 East; Township 21 South, Ranges 21 and 22 East; Township 22 South, Range 21 East, Sections 1 through 12; and Township 22 South, Range 22 East, Sections 1 through 12, NMPM.

(ii) *Depth.* The Permo-Penn Formation varies in thickness from 1,000 feet to 1,400 feet, and lies between the base of the Wolfcamp Formation and the top of the Canyon Formation. The Permo-Penn includes the Third Sister, the Antelope Sink, and the Cisco Formations. The average depth to the top of the Permo-Penn Formation is 5,822 feet.

(99) *Atoka-Morrow Formation in New Mexico.* RM79-76-116 (New Mexico—15).

(i) *Delineation of formation.* The Atoka-Morrow Formation is located in Chaves County, New Mexico, approximately 23 miles northeast of Roswell, New Mexico. The Atoka-Morrow Formation is found in Township 7 South, Range 28 East, Sections 22 through 27, and 34 through 36; Township 7 South, Range 29 East, Sections 19 through 36; Township 7 South, Range 30 East, Sections 19 through 36; Township 7 South, Range 31 East, Sections 19, 20, 21, and 28 through 33; Township 8 South, Range 28 East, Sections 1, 2, 3, 10 through 15, 22 through 27, and 34, 35, 36; Township 8 South, Range 29 East, Sections 1 through 36; Township 8 South, Range 30 East, Sections 1 through 36; Township 8 South, Range 31 East, Sections 4 through 9, 16 through 21, and 28 through 33; Township 9 South, Range 28 East, Sections 1, 2, 3, and 10 through 15; Township 9 South, Range 29 East, Sections 1 through 18; Township 9 South, Range 30 East, Sections 1 through 18; Township 9 South, Range 31 East, Sections 4 through 9, and 16, 17, and 18.

(ii) *Depth.* The Atoka-Morrow Formation varies in thickness from 91 feet to 895 feet. The average depth to the top of the Atoka-Morrow Formation is 8,100 feet.

(100) *"Princeton" Zone of the Mauch Chunk Group in West Virginia.* RM79-76-092 (West Virginia—1).

(i) *Delineation of formation.* The "Princeton" zone of the Mauch Chunk Group underlies portions of Mercer, McDowell and Wyoming Counties, West Virginia. The "Princeton" zone is also called "Salt Sands" or "Maxton" by drillers.

(ii) *Depth.* The "Princeton" zone ranges in thickness from 0 to 100 feet, and is found at a depth of approximately 1,400 to 1,500 feet in north-central Wyoming County. It is bounded above by the Pottsville Group of Pennsylvanian age (referred to as "Salt Sands" or "Rosedale Gas Sands" by drillers) or by the Bluestone Formation of Mississippian age (also called "Salt Sands" by drillers).

(101) *"Ravencliff" zone of the Mauch Chunk Group in West Virginia.* Docket No. Rm79-76-092 (West Virginia—1 Addition).

(i) *Delineation of formation.* The "Ravencliff" zone of the Mauch Chunk Group, also called "Salt Sands" or "Maxton" by drillers, is found in portions of Mercer, McDowell and Wyoming Counties, West Virginia.

(ii) *Depth.* The "Ravencliff" zone ranges in thickness from stringers in the western portion of the designated area, to 150 feet in the central and southwestern portion of the area. It is found at depths varying from 1,100 to 2,100 feet.

(102) *"Injun" Zone of the Pocono Group in West Virginia.* Docket No. RM79-76-092 (West Virginia—1 Addition).

(i) *Delineation of formation.* The "Injun" zone of the Pocono Group, also called "Big Injun", underlies portions of Mercer, McDowell and Wyoming Counties, West Virginia.

(ii) *Depth.* The "Injun" zone varies in thickness from 50 feet in Wyoming County to stringers in the southern and eastern portions of the designated area. The depth to the top of the "Injun" zone ranges from approximately 3,100 feet to 4,300 feet.

(103) *"Weir" Zone of the Pocono Group in West Virginia.* RM79-76-092 (West Virginia—1 Addition).

(i) *Delineation of formation.* The "Weir" zone of the Pocono Group underlies portions of Mercer, McDowell and Wyoming Counties, West Virginia.

(ii) *Depth.* The "Weir" zone ranges in thickness from stringers in the eastern and western portion of the designated area, to 70 feet in the central part of the area. The "Weir" zone is found at depths varying from 3,250 feet to 4,550 feet.

(104) *"Berea" zone of the Pocono Group in West Virginia.* RM79-76-092 (West Virginia—1 Addition).

(i) *Delineation of formation.* The "Berea" zone of the Pocono Group underlies portions of Mercer, McDowell and Wyoming Counties, West Virginia.

(ii) *Depth.* The "Berea" zone has a maximum thickness of 45 feet in the central portion of McDowell and Wyoming Counties, and varies to shaley sandstone stringers in the eastern portion of the designated area. The "Berea" zone is found at depths ranging from 3,600 feet to 4,950 feet.

(105) *Wasatch Formation in Colorado.* RM79-76-061 (Colorado-21).

(i) *Delineation of formation.* The Wasatch Formation is found in Garfield County, Colorado, in Township 6 South, Range 93 West, 6th P.M., Sections 3 through 10, 15 through 22, and 27 through 34, and Township 6 South, Range 94 West, 6th P.M., Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36. Ex-

cluded from this designation are the Naval Oil Shale leaseholds found in portions of Township 6 South, Range 94 West, Sections 2, 3 and 10.

(ii) *Depth.* The Wasatch Formation extends from the surface of the ground to the top of the Williams Fork and Iles members of the Mesaverde Formation. The average depth to the top of the producing interval of the Wasatch Formation is 1,767 feet.

(106) *Strawn-Detrital Formation in Texas. RM79-76 (Texas—22)*—(i) *University Block 31 (Strawn-Detrital) and Howards Creek (Penn) Fields*—(A) *Delineation of formation.* The Strawn-Detrital Formation in the area of the University Block 31 and Howards Creek Fields located in Crockett County, Texas, Railroad Commission District 7C. The designated area consists of Sections 7, 8, 9, the south half of Section 10, Sections 16 through 20, the south half of Section 21, Sections 29 through 32, Block 30, University Lands Survey; all Sections in Block 31, University Lands Survey; Sections 1, 2, 3, the south half of Section 4, Sections 5 through 8, the south half of Section 9, Sections 11 through 14 and the north half of Section 18, Block 32, University Lands Survey; Sections 6 through 20, Block 33, University Lands Survey; the southwest ¼ of Section 12, Sections 29, 30, 31, the south half of Section 32, Sections 50, 51 and the southeast ¼ of Section 53, Block UV, GC & SF RR Co. Survey; Section 2, Block ST-2, GC & SF RR Co. Survey; the north half of Hampton Survey; Section 1001 of W. G. Hall Survey; Section 1002 of J. M. Jean Survey; Section 1003 of M. F. Lopez Survey; Sections 1, 2, 14 through 18, Block ST, GC & SF RR Co. Survey; the north half of Section 49, Sections 50 through 53, the south half Section 54, Sections 66 through 70, the east half of Section 71, Sections 76 through 79, the south half of Section 90, Sections 91, 92, 93 and the north half of Section 94, Block OP, GC & SF RR Co. Survey; Sections 20, 21, 22, 29, 37, 38, the western 75 acres of Section 34,

the western half of Section 36 and the eastern half of Section 41, Block ST, T.C.R.R. Survey; Section 28, Block ST, H.E. & W.T. Survey; Section 8 and the northern 480 acres of Sections 7 and 10, Block SL, T. & S.T.L. Survey; and the northern 98 acres of Block Z, J. W. Henderson Survey.

(B) *Depth.* The vertical extent of the Strawn-Detrital Formation in the University Block Field is defined as the interval from the base of the Canyon Formation (top of the Strawn series) to the top of the Simpson Shale (base of the Devonian), which includes the Strawn, Strawn-Detrital and Devonian zones. The average depth to the top of the Strawn series is approximately 7,900 feet in the north and 8,900 feet in the south.

(ii) *Perner Ranch Area*—(A) *Delineation of formation.* The Detrital Formation in the Perner Ranch Area is located approximately 23 miles west-southwest of the city of Ozona, Crockett County, Texas, Railroad Commission District 7C. The area includes the following sections: L & SV Survey, Sections 199 and 200, and T.C. RR Survey, Sections 43 and 45.

(B) *Depth.* The depth to the top of the Detrital Formation varies from —6,000 feet to the northwest part to the area to —6,700 feet in the southeast. The approximate thickness of the formation is 110 feet.

(iii) *Ozona, S.W. (Strawn) Field*—(A) *Delineation of Formation.* The Strawn-Detrital Formation in the area of the Ozona, S.W. (Strawn) Field is located in Crockett County, Texas, Railroad Commission District 7C. The designated area consists of the south half of Section 1, Sections 2, 3, 4, the east half of Section 8, Sections 9, 10, 11, the south halves of Sections 12 and 13, Sections 14, 15, 16, the west half of Section 17, Section 21, and the west half of Section 23, Block M, GC and S.F. Survey; Sections 4, 5, 6, the south quarters of Sections 7 and 10, Sections 11, 12 and 13, Block S.L., T and

S.T.L. Survey; and a portion ot Block Z, J. W. Henderson Survey.

(B) *Depth.* The vertical extent of the Strawn-Detrital Formation in the Ozona, S.W. (Strawn) Field is defined as the interval from the base of the Canyon Formation (top of the Strawn series) to the top of the Simpson Shale (base of the Devonian), which includes the Strawn, Strawn-Detrital and Devonian zones. The average depth to the top of the Strawn series is approximately 8,800 feet.

(107) *Chacra Formation in New Mexico.* RM79-76-117 (New Mexico—16).

(i) *Delineation of formation.* The Chacra Formation is located in all of Sections 16, 21, 22, 25 through 28, 34 through 36, and the S/2 of Section 23, Township 25 North, Range 6 West, NMPM, in Rio Arriba County, New Mexico.

(ii) *Depth.* The Chacra Formation averages approximately 130 feet in thickness. The average depth to the top of the Chacra Formation is 3,390 feet.

(108) *Dakota-Lakota Formation in Colorado.* RM79-76-123 (Colorado—26).

(i) *Delineation of formation.* The Dakota-Lakota Formation is located in Boulder County, Colorado, in Township 1 North Range 69 West, 6th P.M., Sections 25 through 36; Township 1 South, Range 69 West, 6th P.M., Sections 3 through 10, 15 through 22, and 27 through 34; Township 1 South, Range 70 West, 6th P.M., Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36.

(ii) *Depth.* The producing interval of the Dakota-Lakota Formation is approximately 175 to 185 feet thick, and begins at the base of the Skull Creek Formation and extends to the top of the Morrison Formation. The aver-

age depth to the top of the Dakota-Lakota Formation is 9,100 feet.

(109) *Codell Formation in Colorado.* RM79-76-122 (Colorado-25).

(i) *Delineation of formation.* The Codell Formation underlies portions of Adams, Boulder, Jefferson, Larimer and Weld Counties, Colorado, and is located on the western flank of the Denver-Julesberg Basin a few miles north of Denver, Colorado. The Codell Formation is found in the following areas: Township 1 South, Ranges 64 through 70 West; Township 2 South, Ranges 69 and 70 West; Township 1 North, Ranges 64 through 70 West; Township 2 North, Ranges 64 through 69 West, all sections, Range 70 West, Sections 1 through 5, and 8 through 36; Township 3 North, Ranges 64 through 69 West, all sections, Range 70 West, Sections 1, 12, 13, 21 through 28, and 33 through 36; Township 4 North, Ranges 64 through 69 West; Township 5 North, Ranges 64 through 68 West, all sections, Range 69 West, Sections 1 through 4, 9 through 16, 20 through 29, and 31 through 36, Township 6 North, Ranges 64 through 68, all sections, Range 69 West, Sections 1 through 4, 9 through 16, 21 through 28, and 33 through 36.

(ii) *Depth.* The Codell Formation ranges in depth from 3,000 to 8,000 feet, and is generally found at a depth of 7,000 feet, and averages 15 feet in thickness.

(110) *The Dakota Producing Interval in New Mexico.* RM79-76-103 (New Mexico—9).

(i) *Delineation of formation.* The Dakota Producing Interval is found within the Basin-Dakota Gas Pool in the northwestern portion of the San Juan Basin near the Hogback Monocline. It is found in San Juan County, in Township 31 North, Range 10 West, NMPM, Sections 1 through 36; Township 31 North Range 11 West, NMPM, Sections 1, 12, 13, 22 through 27 and 34, 35 and 36; Township 32 North, Range 10 West, NMPM, Sections 7

through 36; Township 32 North, Range 11 West, NMPM, Sections 7 through 27 and 34, 35 and 36; Township 32 North, Range 12 West, NMPM, Sections 7 through 24, 28 through 31; and Township 32 North, Range 13 West, NMPM, Sections 7 through 29 and 32 through 36.

(ii) *Depth.* The Dakota Producing Interval begins at the base of the Greenhorn Limestone and consists of the Graneros Formation, the Dakota Formation and the productive upper limit of the Morrison Formation. The average depth to the top of the Dakota Producing Interval is 6,753 feet. The gross thickness of the interval averages 400 feet.

(111) *The Olmos Formation in Texas.* Rm79-76 (Texas—16)—(i) *Dimmit and Webb Counties*—(A) *Delineation of formation.* The Olmos Formation is located in the northwest portion of Webb County and the southern portion of Dimmit County in Texas. The Formation includes all of that portion of Dimmitt County extending approximately 14 miles north of the boundary of Webb County, and all of that portion of northwest Webb County west of a north-south line extending south from a point approximately 1.5 miles east of the southwest corner of La Salle County, and north of an east-west line located approximately 22 miles south of the southwest corner of La Salle County.

(B) *Depth.* The top and base of the Olmos Formation are found at approximate depths of 4,146 feet and 5,237 feet respectively, on the log of the Trans Delta Corporation Petty Well No. 6-7. This well is located in Section 7, Block 8, of the I&G.N.R.R. Co. Survey in the S.W. Catarina Field, Webb County, Texas.

(ii) *A.W.P. (Olmos) Field, McMullen County*—(A) *Delineation of formation.* The Olmos Formation designated area underlies portions of the A.W.P. Olmos Field and consists of 4,853 contiguous acres located 3½ to 5

miles southeast of Tilden, Texas. Specifically, the area is all of Sections 24, 25, 27, 37, 38, 39, the west ½ Section 23, the southwest ¼ of Section 28, the north ½ of Section 41, and the north ½ of Section 42, out of the Two Rivers Ranch Subdivision as shown by plat recorded in Volume O, page 460 (Bracken Lease) and page 464 (McClaugherty Lease) of the Deed Records, McMullen County, Texas.

(B) *Depth.* The top of the Olmos Formation occurs at depths of from 9,100 feet to 9,600 feet below mean sea level.

(112) *The Mancos "B" Formation in Colorado.* RM79-76 (Colorado-27).

(i) *Delineation of formation.* The Mancos "B" Formation is located in the Douglas Creek Arch area of western Colorado, in Rio Blanco County. The Mancos "B" Formation underlies Township 1 North, Range 101 West, Sections 17 through 20 and 29 through 32; Township 1 North, Range 102 West, Sections 7 through 9 and 13 through 36; Townships 1 North and 1 South, Range 103 West, all sections; Townships 1 North and 1 South, Range 104 West, Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36; Township 1 South, Range 102 West, Sections 1 through 10, 16 through 21, and 28 through 33; Township 2 South, Range 102 West, Sections 4 through 6; Township 2 South, Range 103 West, Sections 1 through 6, 17, 18, 20, 29, 32, and 33; and Township 2 South, Range 104 West, Sections 1 through 3 and 10 through 15. The additional area is contiguous to that part of the Mancos "B" Formation described above on its northern border. The addition to the Mancos "B" Formation is located in Rio Blanco County, Colorado, along the western flank and northern end of the Douglas Creek Arch in Township 2 South, Range 102 West N½ of Section 8 and N½ and SE¼ of Section 9. On its eastern border, the specified acreage is adjacent to lands described in § 271.703(d)(6).

(ii) *Depth.* The Mancos "B" Formation ranges in thickness from 150 to 325 feet. The average depth to the top of the Mancos "B" Formation is 3,000 feet. The additional area, located in the southern part of the Mancos "B" Formation, has an average depth to the top of the formation of 2,621 feet and an average gross thickness of 375 feet.

(113) *The Clearfork Formation in Texas.* RM79-76-114 (Texas-23).

(i) *Delineation of formation.* The Clearfork Formation is found in Pecos County, Texas. The designated area is located approximately 12 miles southeast of the City of Imperial, Texas, within the H&TC RR Block 2 and H&GN RR Block 9 Surveys.

(ii) *Depth.* The top of the Clearfork Formation ranges from a measured depth of 2,900 feet in the west to 3,000 feet in the east. A typical Clearfork section occurs between the measured depths of 2, 895 feet and 4,124 feet, on the well log of the George T. Abell No. 1-A Well.

(114) *The J Sand Formation in Colorado.* RM79-76-133 (Colorado-29).

(i) *Delineation of formation.* The J Sand Formation is located in Adams and Arapahoe Counties, Colorado, approximately 24 miles due east of the city of Denver. The J Sand Formation underlies Township 3 South, Range 62 West, Sections 17 through 20, and 29 through 32; Township 3 South, Range 63 West, Sections 13 through 36; Township 4 South, Range 62 West, Sections 5 through 8, 17 through 20, and 29 through 32; and Township 4 South, Range 63, All Sections, 6th P.M.

(ii) *Depth.* The J Sand Formation ranges in thickness from 20 to 180 feet. The average depth to the top of the J. Sand Formation is 7,700 feet.

(115) *Dakota Formation in New Mexico.* RM79-76-138 (New Mexico-17).

(i) *Delineation of formation.* The Dakota Formation is located in the northwestern portion of the San Juan Basin in San Juan County, New Mexico. The Dakota Formation underlies all of Township 26 North, Ranges 12 and 13 West; Township 27 North, Range 12 West, Section 8-S/2, 9-S/2, and 16 through 36; Township 27 North, Range 13 West, Sections 3-W/2, 4 through 9, 10-W/2, and 14 through 36; Township 28 North, Range 13 West, Sections 7 through 9, 16 through 21, 28 through 33, and 34-W/2; Township 29 North, Range 13 West, Sections 4 through 9, 16 through 19, 20-W/2, 29-W/2, 30, 31, and 32-W/2; Township 29 North, Range 14 West, Sections 1, 2-W/2 and SE/4, 3 through 18, 19-NE/4, 20 through 27, 28-N/2 and SE/4, 34-N/2, 35 and 36; Township 29 North, Range 15 West, Sections 1 through 6, 7-N/2, 8-N/2, 9-N/2, 10-N/2 and SE/4, 11, 12, 13-N/2 and 14-N/2; Township 30 North, Range 14 West, Sections 1 through 12, 15 through 23, and 26 through 34; and all of Township 30 North, Range 15 West, NMPM.

(ii) *Depth.* The Dakota Formation ranges in thickness from 250 to 300 feet. The average depth to the top of the Dakota Formation is 5,952 feet.

(116) *"Cleveland Sand" of the "Kansas City Group" in Oklahoma.* RM79-76-120 (Oklahoma—2).

(117) *Gray Sand in Smackover Formation in Louisiana.* RM79-76-124 (Louisiana—8).

(i) *Delineation of formation.* The Gray Sand in the Smackover Formation is located in the following portions of Bienville, Bossier, Claiborne, Lincoln, Ouchita, Union, and Webster Parishes, north Louisiana: Township 22 North, Range 8 West through 13 West; Township 21 North, Range 2 West through 13 West; Township 20 North, Range 2 West through 13 West; Township 19 North, Range 1 East; Township 19 North, Range 1 West through 10 West; Township 18 North, Range 1 East; Township 18 North, Range 1 West through 5 West.

(ii) *Depth.* The Gray Sand in the Smackover Formation is defined as that formation occurring between the measured depths of 11,000 and 11,570 feet on the induction electric log of the Sun Oil Company—Northcott No. 2 Well, located in Section 29, Township 22 North, Range 11 West, Bossier Parish.

(118) *Medina Group and Queenston Shale in New York.* RM79-76-118 (New York—2).

(i) *Delineation of formation.* The Medina Group and Queenston Shale are found in Erie, Genesee, Wyoming, Allegany, Livingston, Ontario, Yates, Seneca, Cayuga, and Tompkins Counties, New York. Excluded from the delineated Medina-Queenston interval are any Medina gas storage areas, including buffer zones, or any areas within Medina or Queenston "existing fields" (as defined in Title 6, New York Code of Rules and Regulations, Section 550.3(q)). The Medina Group (also known as the Albion Group) is of Early Silurian age and overlies the Upper Ordovician Queenston Shale (called the "red shale" by some drillers). The Medina Group is bounded above by the base of the Thorold Formation or the time equivalent Kodak Sandstone. The Medina Group consists of (from base to top) the Whirlpool Sandstone (called "white Medina" by drillers), the Power Glen Shale (also known as the Cabot Head Shale), and the Grimsby Sandstone (called "red Medina" by drillers). The Queenston Shale has a gradational contact with the underlying Oswego Sandstone.

(ii) *Depth.* The depth to the top of the Medina Group varies from less than 1,000 feet in the northwestern portion of the designated area to as much as 5,500 feet in this southeastern portion. The Medina Group ranges in thickness from approximately 60 to 120 feet. The thickness of the Queenston Shale is indefinite due to the transitional nature of its contact with the underlying Oswego Sandstone, but the Queenston-Oswego sequence ranges in a thickness from approximately 1,000 feet in Western

New York to more than 1,300 feet in southern and central New York.

(119) *Dakota Formation in Utah.* RM97-76-074 (Utah—3).

(i) *Delineation of formation.* The Dakota Formation is found in the Book Cliffs area of Grand and Uintah Counties, Utah and is in the general area of Townships 15 South through 20 South and Ranges 16 East through 24 East.

(ii) *Depth.* The average depth to the top of the Dakota Formation is 6,034 feet. The Dakota Formation is defined as the interval from the top of the Dakota Silt down to the top of the Morrison Formation, a thickness of approximately 250 feet.

(120) *Basin-Dakota Formation in New Mexico.* RM 79-76-139 (New Mexico—18).

(i) *Delineation of formation.* The Basin-Dakota Formation is located in San Juan County, New Mexico, in Township 32 North, Range 7 West, Sections 7, 8, 9, 16 through 21, and 25 through 36; Township 32 North, Range 8 West, Sections 7 through 36; Township 32 North, Range 9 West, Sections 7 through 36, Township 31 North, Range 8 West, Sections 1 through 31, and 33 through 36; Township 31 North, Range 9 West, Sections 1 through 26, and 29 through 36; Township 30 North, Range 8 West, Sections 1, 2, 6 through 34, and 36; Township 30 North, Range 9 West, Sections 1 through 30, 35 and 36; Township 30 North, Range 10 West, Sections 1 through 18 and 24; Township 29 North, Range 8 West, Sections 1 through 6; Township 29 North, Range 9 West, Sections 1 and 2, NMPM.

(ii) *Depth.* The Basin-Dakota Formation is defined as that interval including the Graneros, Dakota, and Morrison Formation, and is found below a depth of

7,251 feet as indicated on the Induction-Electrical and Gamma Ray log from the El Paso Natural Gas Gartner No. 9 Well. The average depth to the top of the Basin-Dakota Formation is 7,575 feet. Gross thickness of the Basin-Dakota Formation ranges from 250 to 300 feet.

(121) *Atoka Formation in Oklahoma.* RM79-76-131 (Oklahoma—4)—(i) *Delineation of formation.* The Atoka Formation of Pennsylvanian age is located in Washita County, Oklahoma, in Sections 6 and 7, Township 9 North, Range 19 West and Sections 1, 2, 3, 10, 11, and 12, Township 9 North, Range 20 West. It is bounded above by the base of the Pennsylvanian Des Moinesian Series, called "Cherokee Group" by drillers and below by the top of the Pennsylvanian Morrowan Series, called "Morrow Shale" by drillers.

(ii) *Depth.* The depth to the top of the designated interval varies from approximately 10,850 to 12,150 feet below mean sea level. Its thickness ranges from 2,200 to 2,800 feet.

(122) *Garza Sand in Texas.* RM79-76-141 (Texas—24).

(i) *Delineation of Formation.* The Garza Sand is found in Duval County in Texas. The designated area is located approximately 3 miles west of the city of Concepcion, Texas, in Railroad Commission District 4 and includes portions of the following surveys: Andres Garcia Heirs Survey, Abstract 657; Santos Flores Survey, Abstract 475; R. Ramirez Survey, Abstract 475; and Marcello Ynojosa Survey, Abstract 628.

(ii) *Depth.* The top of the Garza Sand ranges from a measured depth of —6,700 feet to approximately —7,400 feet subsea.

(123) *Anacacho formation in Texas.* RM79-76-145 (Texas—26).

(i) *Delineation of formation.* The Anacacho formation is located in the northwestern part of Atascosa County, Texas, Railroad Commission District 1 and is comprised of the following surveys: F. Brockinzen A-90, Abram Cole A-158 and A-159, W. J. Viser A-873 and A-874, Craner Ford A-247 and A-248, John C. Held A-368, John Sharp A-761, Robert C. Rogers A-721, J. S. Joline A-500, H. P. Benningfield A-97, Wm. H. Morris A-899, and Nepomucinco Flores A-244.

(ii) *Depth.* The Anacacho Formation in the Benton City Area is encountered at measured depths ranging from 1,600 feet to 2,100 feet.

(124) *Mancos "B" Formation in Utah.* RM79-76-155 (Utah—7)—(i) *Delineation of formation.* The Mancos "B" Formation is located in Carbon County, Utah and comprises all of Township 12 South, Range 13 East, SLM.

(ii) *Depth.* The Mancos "B" Formation is a distinct lithologic unit of the Mancos Shale, occurring 200 to 300 feet below the top of the Mancos Formation. The formation varies in thickness from 1,400 to 1,600 feet and is found at an average depth of 7,490 feet.

(125) *Monte Christo, South (10,500') Formation in Texas.* RM79-76 (Texas—25).

(i) *Delineation of formation.* The Monte Christo, South (10,500') Formation is located in the southern portion of Hidalgo County, Texas, Railroad Commission, District 4, and includes the following surveys: Macedonia Jr. Vela No. 214, A-623; Tex.-Mex. R.R. No. 215, A-130; W. T. Bomar No. 218, A-626; Jas. L. Hudson, A-649; Walter A. Hoffhein, A-797; W. H. Kozel, A-798; Tex.-Mex. R.R. No. 217, A-131; the northernmost 500 acres of both the Nicholas Zamora Porcion No. 48, A-76 and the Torebio Zamora Porcion No. 49, A-78; and the southernmost 900 acres of the northern 1,800 acres of the Francisco Cantu Porcion No. 80, A-570.

(ii) *Depth.* The depth to the top of the Monte Christo, South (10,500) Formation varies from 10,200 feet subsea to 10,600 feet subsea. The maximum thickness of the formation is approximately 900 feet.

(126) *Abo-Wolfcamp Formation in New Mexico.* RM 79-76-180 (New Mexico—20).

(i) *Delineation of formation.* The Abo-Wolfcamp Formation is located in Chaves County, New Mexico, in Township 15 South, Ranges 23, 24, and 25 East, All Sections; Townships 19 and 20 South, Range 20 East, All Sections; in Eddy County, New Mexico in Township 16 South, Ranges 23, 24, and 25 East, All Sections; Township 16 South, Range 26 East, Sections 4 through 9, 16 through 21, and 28 through 33; Township 17 South, Ranges 21, 23, and 24 East, All Sections; Township 17 South, Range 25 East, Sections 1 through 12, 16 through 21, and 30 and 31; Township 18 South, Ranges 21, 23, and 24 East, All Sections; Township 18 South, Range 25 East, Sections 6 and 7, 18 and 19, and 30 and 31; Township 19 South, Ranges 21 and 23 East, All Sections; Township 19 South, Range 24 East, Sections 1 through 20, and 29 through 32; Township 20 South, Ranges 21 and 23 East, All Sections; and Township 20 South, Range 24 East, Sections 5 through 8, NMPM

(ii) *Depth.* The average depth to the top of the Abo-Wolfcamp Formation is 3,615 feet. The top and base of the Abo-Wolfcamp Formation are found at 4,722 feet and 5,122 feet, respectively, as measured on the Induction-Electrical Log of the Yates Petroleum Corporation State DF well No. 1.

(127) *Mesaverde Formation in Colorado.* RM79-76-163 (Colorado—31).

(i) *Delineation of formation.* The Mesaverde Formation is located in Rio Blanco County, Colorado, in Township 2 South, Range 96 West, Section 31 S½, S½, NW¼, Section 32 S½, S½, Section 33 SW¼, SW¼; Township

2 South, Range 97 West, Section 4 W½, W½, Sections 5, 8, 9, 16, 17, 20, 21, 22, All, Section 23 W½, Section 25 SW¼, Section 26 W½, SE¼, Sections 27, 28, 29, 31 through 36, All; Township 3 South, Range 97 West, Sections 3 through 7, All; all 6th P.M.

(ii) *Depth.* The average depth to the top of the Mesaverde Formation is approximately 7,790 feet. The producing interval is approximately 4,800 feet in thickness and begins at the base of the Ohio Creek Conglomerate and extends to the top of the Marine Mancos Shale.

(128) *Vicksburg Formation in the Portilla (9,000') Field in Texas.* RM79-76 (Texas—29).

(i) *Delineation of formation.* The Vicksburg Formation in the Portilla (9,000') Field is located in the northern portion of San Patricio County, Texas, Railroad Commission District 4, approximately six miles northeast of Sinton, Texas, and underlies 15,000 acres of land bounded by the Chiltipin Creek to the south, U.S. Highway 77 to the west, and the Aransas River to the north. The eastern boundary is a line extending from the Chiltipin Creek on the south to the Aransas River on the north and approximately bisecting the following surveys; Isaac Clover A-89, N.J. Devenny A-105, and Ralph Ellis Hrs. A-115.

(ii) *Depth.* The depth to the top of the Vicksburg Formation in the Portilla (9,000') Field varies between 8,600 feet and 9,000 feet and the formation extends to depths in excess of 11,000 feet.

(129) *Cleveland Formation in Texas.* RM79-76 (Texas—18).

(i) *Delineation of formation.* The Cleveland Formation is found in the northeast Texas Panhandle and consists of all Lipscomb, Ochiltree and Hansford Counties, virtually all of Hemphill County, approximately the northern halves of Hutchinson and Roberts Counties, and

approximately the northeast quarter of Wheeler County, Texas.

(ii) *Depth.* The top of the Cleveland Formation is located near 2,500 feet subsea to the west in Hansford County, Texas, and near 9,700 feet subsea in Wheeler County, Texas, to the southeast. The Cleveland Formation is approximately 154 feet thick as demonstrated in a type log from the Diamond Shamrock Corporation No. 1 J. A. Little Well in Lipscomb County, Texas.

(130) *Middle Wilcox (11,000-15,000') Formation in Texas.* RM79-76 (Texas—27).

(i) *Delineation of formation.* The Middle Wilcox Formation is located in Lavaca County, Texas, Railroad Commission District 2. The designated area is located 14 miles east-southeast of the Halletsville, Texas, and 8 miles south-southeast of Sublime, Texas, and is comprised of the following 15 surveys: James Ryan A-42, Miguel Muldoon A-34, E. W. Perry A-359, Lev. T. Bostiok A-95, F. W. Perry A-358, P. Ansuldua A-621, F. Baseldua A-622, Petter Garza A-632, J. A. Wynmaker A-499, John W. Seymour A-431, H. I. and B.P.R. A-523, A. M. Gillespie A-633, H. F. and W.T.R.R. A-551, H. E. and W.T.R.R. A-550, and North ⅓ John D. Ragsdale A-377.

(ii) *Depth.* The Middle Wilcox Formation is defined as that formation which is encountered between 11,000 feet and 15,000 feet as measured on the log of the Mitchell Energy Corporation C. F. Aschbacher No. 1 well. The top of the Middle Wilcox pay ranges in depth from approximately —11,200 feet in the north to —13,300 feet in the south.

(131) *Devonian Formation in Texas.* RM79-76 (Texas—35).

(i) *Delineation of the formation.* The Devonian Formation is located in the Nine Mile Draw Field area of Reeves County, Texas, Railroad Commission District 8.

The designated area consists of Sections 12, 13, 24, 25, 36 and 37 of T&P RR Block 55, and Sections 5, 6, 11, 12, 13, 14, 17, 18, 19, 20, 21, and 22 of T&P RR Block 54, TWP 7, Reeves County, Texas.

(ii) *Depth.* The top of the Devonian Formation is encountered between the measured depths of 13,080 and 14,120 feet, with an approximate thickness of 100 feet.

(132) *Fusselman Formation in Texas.* RM79-76 (Texas—35).

(i) *Delineation of the formation.* The Fusselman Formation is located in the Nine Mile Draw Field area of Reeves County, Texas, Railroad Commission District 8. The designated area consists of Sections 12, 13, 24, 25, 36 and 37 of T&P RR Block 55, and Sections 5, 6, 11, 12, 13, 14, 17, 18, 19, 20, 21, and 22 of T&P RR Block 54, TWP 7, Reeves County Texas.

(ii) *Depth.* The Fusselman Formation is encountered between the measured depths of 13,340 and 14,396 feet, with an approximate thickness of 80 feet.

(133) *The Montoya Formation in Texas.* RM79-76 (Texas—35).

(i) *Delineation of the formation.* The Montoya Formation is located in the Nine Mile Draw Field area of Reeves County, Texas, Railroad Commission District 8. The designated area consists of Sections 12, 13, 24, 25, 36 and 37 of T&P RR Block 55, and Sections 5, 6, 11, 12, 13, 14, 17, 18, 19, 20, 21, and 22 of T&P RR Block 54, TWP 7, Reeves County, Texas.

(ii) *Depth.* The Montoya Formation is encountered between the measured depths of 13,395 and 14,490 feet, with an approximate thickness of 475 feet.

(134) *Mesaverde Formation in New Mexico.* RM79-76-179 (New Mexico—19).

(i) *Delineation of formation.* The Mesaverde Formation is located in San Juan County, New Mexico, Township 32 North, Range 8 West, NMPM, Sections 7, 8, and 17 through 20. The Mesaverde Formation is in the Blanco Mesaverde Gas Pool in the southwestern flank of the San Juan Basin.

(ii) *Depth.* The Mesaverde Formation consists of three members: the Cliffhouse member which average 50 feet in thickness, the Menefee member with thickness range of 230 to 290 feet, and the Point Lookout member which ranges from 150 to 200 feet in thickness. The vertical limits of the Mesaverde Formation are from the Huerfanito Bentonite in the Lewis Shale above to a point 500 feet below the top of the Point Lookout member. The average depth to the top of the Mesaverde Formation is 5,600 feet.

(135) *Morrow Formation in New Mexico.* RM79-76-187 (New Mexico—22).

(i) *Delineation of the formation.* The Morrow Formation is located in Lea and Eddy Counties, New Mexico, in Township 19 South, Range 31 East, Sections 27 S/2, 33 E/2, 34 and 35; Township 20 South, Range 30 East, Sections 25, 26, 31 through 34, 35 N/2 and 36; Township 20 South, Range 31 East, Sections 1 through 36; Township 20 South, Range 32 East, Sections 2 through 11, 14 through 23, and 26 through 35; Township 21 South, Range 28 East, Sections 1 and 2, 3: Lots 3, 4, 5, 6, 11, 12, 13, 14, and S/2, 4 through 20, 21 W/2, 22 through 25, 26 S/2, 27, 28, 29 S/2, and 30 through 36; Township 21 South, Range 29, East, Sections 1 through 7, 8 N/2, and 9 through 36; Township 21 South, Range 30 East, Sections 1 through 12, 14 through 23, and 27 through 34; Township 21 South, Range 31 East, Sections 1 through 12; Township 22 South, Range 28 East, Sections 1 through 28, and 33 through 36; Township 22 South, Range 29 East, Sections 1 through 36; Township 22 South, Range 30 East, Sections 3 through 10, 13 W/2

W/2 and NE/4 NW/4, 14 through 23, 24 W/2 NW/4, and 26 through 36; Township 23 South, Range 29 East, Sections 1 through 3, 10 through 12, 13 W/2 14, 15, 22 through 27, and 34 through 36; Township 23 South, Range 30 East, Sections 1 through 17, 18 S/2 and 19 through 36; Township 23 South, Range 31 East, Sections 19, 30, and 31; Township 24 South, Range 29 East, Sections 1 and 2, 11 through 14, 23 through 26, 35, and 36; Township 24 South, Range 30 East, Sections 1 through 7, 8 N/2, 9 through 16, 17 E/2, and 18 through 36; Township 24 South, Range 31 East, Sections 6, 7, 15 through 22, and 27 through 34; Township 25 South, Range 30 East, Sections 1 through 36; Township 25 South, Range 31 East, Sections 3 through 10, 15 through 22, and 27 through 34; Township 26 South, Range 30 East, Sections 1 through 12; Township 26 South, Range 31 East, Sections 3 through 10; NMPM

(ii) *Depth.* The Morrow Formation is defined as that interval located stratigraphically above the Mississippian Barnett Shale and below the Pennsylvanian Atoka Formations. The average depth to the top of the Morrow Formation is 13,600 feet. The Morrow Formation varies in thickness form 928 feet to 1,475 feet.

(136) *Chacra Formation in New Mexico.* RM79-76-188 (New Mexico—23).

(i) *Delineation of formation.* The Chacra Formation is located approximately 30 miles southeast of the town of Bloomfield in northwestern New Mexico in the southeastern portion of the San Juan Basin. The Chacra Formation is located in all of Sections 4 through 8, and the N/2 of Sections 9 and 10 in Township 25 North, Range 7 West, NMPM; as well as all of Sections 5 through 9, 15 through 22, 26 through 36, the W/2 of Section 10, the S/2 of Section 14, and the SW/4 of Sections 23 and 25 in Township 26 North, Range 7 West, NMPR, in Rio Arriba County, New Mexico.

(ii) *Depth.* The type section for the Chacra Formations is found at a depth of approximately 3,734 feet to 3,844 feet on an Induction Gamma Ray Log from the Curtis J. Little Turner Well No. 2. The average depth to the top of the Chacra Formation is 3,350 feet. Thickness of the Chacra Formation ranges from 110 to 130 feet.

(137) *Vicksburg Formation in Texas.* RM79-76-160 (Texas—30).

(i) *Delineation of formation.* The Vicksburg Formation is located in southwestern Hidalgo County, Texas, Railroad District No. 4, approximately 15 miles west of the city of McAllen. The area comprises the westerly portion of the Los Ejidos de Renosa Viejo Survey A-70 and is bounded on the west and north by the boundary lines of the aforementioned survey. The eastern boundary is a line beginning at a point on the north line of the survey 1,200 feet east of the southwestern corner of the Yldifonso Ramirez Survey, A-584, and extending south for a distance equal and parallel the length of the western boundary line. The southern boundary is a line extending from the south end of the eastern boundary westward to the Rio Grande River which forms the remainder to the southern boundary of the area.

(138) *Devonian/Strawn/Detrital Formation in Texas.* RM79-76-170 (Texas—33).

(i) *Delineation of formation.* The Devonian/Strawn/Detrital Formation is found in northeast Terrell County and adjacent portions of western Crockett County in Texas. The designated area consists of the listed portions of the following Terrell County surveys: Sections 10-31, 73, Block 1, I&GN RR Co.; Sections 19, Mrs. M. E. Hope; Section 21, J. M. Anderson; Section 22, C. M. Shaw (J. D. Blair); Section 23 P. H. Terry; Section 24, Mrs. N. King; Section 1, Block A-4, J McMurty; Section 2 Block A-4, A. C. W.; Section 3 Block A-4, P. L. Kinman;

Section 4, Block A-4, F. Baumgarner; Section 5, Block A-4, J. H. Felps; Section 6, Block A-4, J. L. Cunningham; Section 7, Block A-4, J. A. Manes; Section 8, Block A-4, Mrs. A. Pride; Section 9 Block A-4, Mrs. L. Martin; Section 10, Block A-4, I. N. Bloodworth; Section 11, Block AJ-4, J. E. R.; Section 1-12, Block 176, TM RR; Section 1-38, Block B-2, CCSD & RGNG; and the following Crockett County surveys: Section 24-38, 40-42, 45, 48-50, Block 2, I&GN RR Co.; Section 39-46, Block ST, TC RR; Section 199, 200, L&SV; Section 48, Block ST, TC RR; Section 13-20, Block 2, J. H. Gibson; Section 99, 100, Block NN, GC & SF; Section 22, Block NN-2, WM. Hornsbuckle (A-4873); Section 48½, J. B. Brown; Section 1, Block NN, L. G. Moses; Section 2, Block NN, W. L. Lacy; Section 3, 4, Block NN, Robert Rankin; Section 22-35, Block 1, I&GN RR Co.; Section 14, 22-24, west half of 25, Block 28, University Lands.

(ii) *Depth.* The top of the Strawn section of the Devonian/Strawn/Detrital ranges from a measured depth of 8,442 feet in the east to 10,200 feet in the southwest. The Strawn varies in thickness from 28 feet in the east to 205 feet in the west. The top of the Detrital section ranges from a measured depth of 8,500 feet in the east to 10,310 feet in the southwest. The Detrital varies in thickness from 46 feet in the east to 230 feet in the southwest. The top of the Devonian section ranges from a measured depth of 8,570 feet in the east to 10,900 feet in the southwest. The Devonian varies in thickness from 275 feet in the north central to 600 feet in the northwest. In the western third of the designated area the Detrital and Devonian sections are separated by a wedge of Mississippian age rock units up to 500 feet thick.

(139) *"J" Sand Formation in Colorado.* RM79-76 (Colorado—35).

(i) *Delineation of formation.* The "J" Sand Formation is located in Adams, Arapahoe, and Elbert Counties, Colorado; approximately 12 miles east of the city of Den-

ver. The "J" Sand Formation in Adams County underlies Township 2 South, Range 63 West, Sections 7, 8, 18, 19, 30, 31 and S½ of Section 32; Township 2 South, Range 64 West, Sections 10 through 15, 22 through 27, and 34 through 36; Township 2 South, Range 65 West, Sections 25 through 36; Township 3 South, Range 63 West, Sections 1 through 12; Township 3 South, Range 64 West, Sections 1 through 36; Township 3 South, Range 65 West, Sections 1 through 36. In Arapahoe County, the "J" Sand Formation underlies Township 4 South, Range 64 West, Sections 1 through 30 and 32 through 36; Township 4 South, Range 65 West, Sections 1 through 30; Township 5 South, Range 63 West, Sections 1 through 36; Township 5 South, Range 64 West, Sections 1 through 5, 8 through 17, 20 through 29, and 32 through 36. In Elbert County, the subject formation underlies Township 6 South, Range 63 West, Sections 1 through 35; Township 6 South, Range 64 West, Sections 1 through 5, 8 through 17, 20 through 29, and 34 through 36; Township 7 South, Range 63 West, Sections 4 through 9, 16 through 21, and 28 through 33; Township 7 South, Range 64 West, Sections 1 through 3, 10 through 15, 22 through 27, and 34 through 36, all 6th p.m.

(ii) *Depth.* The "J" Sand Formation ranges in thickness from 40 to 95 feet, and begins at the base of the "D" Sand and extends to the top of the Skull Creek Shale. The average depth to the top of the "J" Sand Formation is approximately 8,100 feet.

(140) *"Jones Sand member" of the "Cleveland Sand" interval of the Skiatook Group in Oklahoma.* RM79-76-148 (Oklahoma—5).

(i) *Delineation of formation.* The "Jones Sand member" of the "Cleveland Sand" interval is found in Sections 1 through 4 and 9 through 12, Township 13 North, Range 2 East; Sections 4 through 8, Township 13 North, Range 3 East; Sections 21 through 28 and 33 through 36,

Township 14 North, Range 2 East; and Sections 19, 20 and 28 through 33, Township 14 North, Range 3 East, in Lincoln County, central Oklahoma. The "Jones Sand member" consists of three quartz sandstone zones ("upper," "middle" and "lower") and two interbedded zones of predominantly shale.

(ii) *Depth.* The depth of the designated interval ranges from 3,910 to 4,500 feet, and it is approximately 200 feet thick. The top of the designated interval is overlain by a shale zone (ranging from 200 to 280 feet in thickness), the "Upper Cleveland sand" and the "Checkerboard limestone" of the Lower Skiatook Group; the base of the interval is underlain by a shale zone (ranging from 100 to 150 feet in thickness) which separates the "Oswego limestone" of the Marmaton Group (Des Moinesian age) from the "Lower Jones sand" zone.

(141) Hosston B Zone in Louisiana RM79-76-192 (Louisiana-9)

(i) *Leatherman Creek Field Area*—(A) *Delineation of formation.* The Hosston B Zone is located in north Louisiana and underlies parts of the Leatherman Creek Field, Claiborne Parish and includes Township 19 North, Range 7 West, Sections 7 through 11, 14 through 23, and 26 through 35, and Township 19 North, Range 8 West, Sections 12, 13, 24, 25 and 36.

(B) *Depth.* The top of the Hosston B Zone is measured at 8,260 feet and the base at 10,000 feet giving a total thickness of 1,740 feet, on the induction electric log of the McGoldrick Oil Company Bessie Sherrill No. 1 well, located in Section 21 of Township 19 North, Range 7 West.

(ii) *Bear Creek Field Area*—(A) *Delineation of formation.* The Hosston B Zone Reservoir A, is located in north Louisiana and underlies part of the Bear Creek Field, Bienville Parish and includes the south three-quarters of Section 22, the west three-quarters of Sec-

tion 26, and all of Sections 27 and 28 of Township 16 North, Range 6 West.

(B) *Depth.* The top of the Hosston B Zone, Reservoir A, is measured at 8,890 feet and the base at 9,801 feet, giving a total thickness of 911 feet, on the induction electric log of the Franks Petroleum, Inc., Lucius C. Gresham B No. 1 well located in the southeast quarter of Section 28, Township 16 North, Range 6 West.

(142) *Upper Mesaverde Formation.* RM79-76-168 (Colorado—32).

(i) *Delineation of formation.* The Upper Mesaverde Formation is located in Mesa County, Colorado, in Township 8 South, Range 98 West, Section 25, N½, SE¼, N½SW¼, SE¼SW¼; Section 26, N½, SW¼, NW¼ SE¼; Sections 27 through 34; Section 35, W½, SE¼, W½NE¼, SE¼NE¼; Section 36; Township 9 South, Range 98 West, Sections 1 through 12, 6th P.M.

(ii) *Depth.* The average depth to the top of the Upper Mesaverde Formation is 500 feet. The Upper Mesaverde Formation is defined as that formation which occurs between the top of the Cozzette-Corcoran members and the base of the Wasatch Formation, including the Rollins member. The Upper Mesaverde Formation averages 2,200 feet in thickness.

(143) *Morrison Formation in Colorado.* RM 79-76 (Colorado-37)

(i) *Delineation of formation.* The Morrison Formation is located in Mesa and Garfield Counties, Colorado, in Township 7 South, Ranges 95 through 100 West; Township 8 South, Ranges 95 through 100 West; Township 9 South, Ranges 95 through 99 West; Township 9 South, Range 100 West, Sections 1 through 4, 9 through 16, 22 through 26, and 36; Township 10 South, Ranges 95 through 99 West; Township 11 South, Ranges 95, 96 and 99 West; Township 11 South, Range 98 West, Sections 1

through 14, 23 and 24; and Township 11 South, Range 97 West, Sections 1 through 12, 17 through 20, 6th P.M.

(ii) *Depth.* The average depth to the top of the Morrison Formation is 8,050 feet. The Morrison Formation is overlain by the Dakota Formation and consists of the upper Brushy Basin Member and the lower Salt Wash Member. The Morrison Formation varies from 400 to 600 feet in thickness.

(144) *Cook Mountain Formation in Texas.* RM79-76 (Texas—36).

(i) *Delineation of formation.* The Cook Mountain Formation is located in Harris County, Texas, Railroad Commission District 3. The designated area is the upper 275 feet of the formation as found in an area roughly rectangular in shape and approximately 6.4 miles by 18.9 miles and located approximately 2.5 miles northwest of the City of Houston, Texas.

(ii) *Depth.* The Cook Mountain Formation is found at subsea depths ranging from —7,300 feet in the west to —8,000 feet in the southeast and is identified as that formation occurring between the measured depths of 7,730 feet and 8,005 feet on the log of the Pringle Petroleum Inc. John Ivy No. 1 well.

(145) *Abo Formation in New Mexico,* RM79-76 (New Mexico-21).

(i) *Delineation of formation.* The Abo Formation is located in San Miguel County; Townships 10 and 11 North, Ranges 14 and 15 East; Torrance County: Townships 1 through 9 North, Ranges 14 and 15 East; Guadalupe County: Townships 2 through 4 North, Ranges 16 through 19 East, Township 5 North, Ranges 16 through 23 East, Township 6 North, Ranges 16 through 24 East, and Townships 7 through 11 North, Ranges 16 through 26 East; DeBaca County: Townships 1 through 4 North, Ranges 20 through 27 East, Township 5 North, Ranges

24 through 26 East, Township 6 North, Ranges 25 and 26 East, Township 1 South, Ranges 20 through 27 East, Township 2 South, Ranges 20 and 21 East, and Township 3 South, Range 21 East; Lincoln County: Township 1 North, Ranges 16 through 19 East, Townships 1 through 5 South, Ranges 14 through 19 East, Township 6 South, Ranges 15 through 20 East, Townships 7 through 9 South, Ranges 15 through 20 East, excepting, however, all lands within the Capitan Wilderness Area, Townships 10 and 11 South, Ranges 15 through 20 East, and Townships 12 and 13 South, Ranges 17 through 20 East; Chaves County: Township 3 South, Range 20 East, Townships 4 and 5 South, Ranges 20 and 21 East, Townships 6 through 11 South, Range 21 East, Township 12 South, Ranges 21 and 21½ East, Township 13 South, Range 21 East, and Township 14 South, Ranges 17 through 21 East, NMPM, containing some 5,775,360 acres, more or less, and designated by New Mexico as the Pecos Slope Extension Area.

(ii) *Depth.* The Abo Formation, for designation as a tight formation in the Pecos Slope Extension Area, shall be defined as being from the base of the Yeso Formation vertically downward to the top of the Hueco Limestone, or in the absence of said Hueco lime, to the top of the Pennsylvanian Limestone, or in the absence of both Hueco lime and Pennsylvanian lime, to the top of the Pre-Cambrian, provided, however, that tongues of the Hueco lime overlain and underlain by the Abo mudstones, sand or shales, shall be considered to be part of the Abo Formation. The average depth to the top of the Abo Formation is 3,025 feet. The average thickness of the Abo Formation is 1,058 feet.

(146) *Frontier Formation in Wyoming.* FM79-76-151 (Wyoming-14).

(i) *Delineation of formation.* The Frontier Formation is located in Fremont County, Wyoming, in the Wind River Basin of central Wyoming. The Frontier Forma-

tion underlies Township 1 South, Range 4 East, Sections 13 through 15, 22 through 27, and 34 through 36; Township 1 South, Range 5 East, Sections 16 through 21 and 28 through 33; Township 2 South, Range 4 East, Sections 1 through 3 and 10 through 12; and Township 2 South, Range 5 East, Sections 4 through 9.

(ii) *Depth.* The Frontier Formation has an average gross thickness of 950 feet. The average depth to the top of the first productive sandstone member of the Frontier Formation is 8,188 feet.

(147) *Muddy Formation in Wyoming.* RM79-76-152 (Wyoming-15).

(i) *Delineation of formation.* The Muddy Formation is located in Fremont County, Wyoming, in Township 1 South, Range 4 East, Sections 13 and 14, 23 through 26, 35 and 36; Township 1 South, Range 5 East, Sections 17 through 20, and 29 through 32; Township 2 South, Range 4 East, Sections 1, 2, 11 and 12; Township 2 South, Range 5 East, Sections 5 through 8.

(ii) *Depth.* The Muddy Formation lies between the base of the Shell Creek Formation and the top of the Dakota Formation. The average depth to the top of the Muddy Formation is 9,337 feet.

(148) *Dakota Formation in Wyoming.* RM79-76-152 (Wyoming-15).

(i) *Delineation of formation.* The Dakota Formation is located in Fremont County, Wyoming, in Township 1 South, Range 4 East, Sections 13 and 14, 23 through 26, 35 and 36; Township 1 South, Range 5 East, Sections 17 through 20, and 29 through 32; Township 2 South, Range 4 East, Sections 1, 2, 11 and 12; Township 2 South, Range 5 East, Sections 5 through 8.

(ii) *Depth.* The Dakota Formation lies between the base of the Muddy Formation and the top of the Lakota

Formation. The average depth to the top of the Dakota Formation is 9,514 feet.

(149) *Lakota Formation in Wyoming.* RM79-76-152 (Wyoming-15).

(i) *Delineation of formation.* The Lakota Formation is located in Fremont County, Wyoming, in Township 1 South, Range 4 East, Sections 13 and 14, 23 through 26, 35 and 36; Township 1 South, Range 5 East, Sections 17 through 20, and 29 through 32; Township 2 South, Range 4 East, Sections 1, 2, 11 and 12; Township 2 South, Range 5 East, Sections 5 through 8.

(ii) *Depth.* The Lakota Formation lies between the base of the Dakota Formation and the top of the Morrison Formation. The average depth to the top of the Lakota Formation is 9,639 feet.

(150) *Monteagle Formation in Tennessee.* RM79-76 (Tennessee-1)

(i) *Delineation of formation.* The Monteagle Formation is found in Morgan, Scott, and portions of Fentress Counties located in the north-central part of the State of Tennessee.

(ii) *Depth.* The average depth to the top of the Monteagle Formation is 1,100 feet. The thickness varies from 180 to 250 feet.

(151) *Mid Cockfield Sand in Louisiana.* RM 79-76-193 (Louisiana-10).

(i) *Delineation of formation.* The Mid Cockfield Sand is found in the Krotz Springs Field in St. Landry Parish, Louisiana. The area includes all or parts of Township 6 South, Range 7 East, Sections 12, 13, 14, and 19 through 24; Township 7 South, Range 7 East, Sections 5 and 6; Township 6 South Range 6 East, Sections 24, 25, 26, 35 and 36; and Township 7 South, Range 6 East, Section 1.

(ii) *Depth.* The depth to the top of the structure in Section 21, Township 6 South Range 7 East, the top of the structure in Section 21, Township 6 South, Range 7 East, the top of the Mid Cockfield Sand is found at 10,670 feet and the base at 10,740 feet (log depths) on a type log located on the eastern flank of a large domal structure, the Gulf Oil Corporation KZS SU FU No. 51 well located in Section 20. Township 6 South, Range 7 East. On the top of the structure in Section 21, Township to South, Range 7 East, the top of the Mid Cockfield Sand is at an approximate log depth of 10,410 feet. The approximate thickness of the sand is 70 feet.

(152) *The Morrow Formation in New Mexico.* RM79-76-199 (New Mexico-24)

(i) *Delineation of formation.* The Morrow Formation underlies all of Sections 25 and 36, Township 23 South, Range 26 East.

(ii) *Depth.* The top of the Morrow Formation is found at an average depth of 11,553 feet and the Morrow Formation is approximately 190 feet in thickness.

(153) *Dakota Formation in Colorado.* RM79-76-197 (Colorado—36)

(i) *Delineation of formation.* The Dakota Formation is located at Township 11 South, Range 95 West, 6th P.M., Sections 1 through 36 inclusive and Township 11 South, Range 96 West, 6th P.M., Sections 1 through 36, inclusive. The designated area is roughly rectangular in shape and consists of approximately 50,830 acres.

(ii) *Depth.* The average depth to the top of the Dakota Formation is 8,100 feet.

(154) *The Vicksburg (12,000 Boyt Sand) Formation in Texas.* RM79-76-158 (Texas—28).

(i) *Delineation of formation.* The Vicksburg (12,000' Boyt Sand) Formation is located in Hidalgo County, Texas, Railroad Commission District 4. The designated

area is within a 2.5 mile radius, the center point of which is located 18,275 feet south and 1,800 feet east of the northwest corner of the Dyonisio Ramirez Porcion 79, Abstract No. 563.

(ii) *Depth.* The Vicksburg (12000′ Boyt Sand) Formation is identified as that formation occurring between the measured depths of 11,802 feet and 12,186 feet on the induction electrical log of the CNG Producing Company Boyt No. 1 Well.

(155) *Plainview Formation in Colorado.* RM79-76-153 (Colorado-30).

(i) *Delineation of formation.* The Plainview Formation is located in Adams and Weld Counties, Colorado, in Township 1 North, Range 67 West, Sections 31 through 33; Township 1 South, Range 67 West, Sections 1 through 36; and Township 1 South, Range 68 West, Sections 1 through 36, 6th P.M.

(ii) *Depth.* The average depth to the top of the Plainview Formation is 8,586 feet. The producing interval is approximately 78 feet in thickness and begins at the base of the Skull Creek Shale and extends to the top of the Lakota Formation.

(156) *Bear River Formation in Wyoming.* RM79-76-209 (Wyoming—17).

(i) *Delineation of formation.* The Bear River Formation is found in Lincoln, Sublette and Sweetwater Counties, Wyoming, in Townships 25 and 26 North, Range 109 West, All; Township 26 North, Range 112 West, Northeast ¼; Township 27 North, Range 112 West, East ½; Township 28 North, Range 112 West, West ⅓; Township 28 North, Range 113 West, Northeast ¼; Township 29 North, Range 111 West, West ½; Township 29 North, Range 112 West, All; Township 29 North, Range 113 West, Sections 1 through 27, and 34 through 36; Townships 30 and 31 North, Ranges 112 and 113 West, All; 6th P.M.

(ii) *Depth.* The Bear River Formation's vertical limits are defined by the Mowry Shale Formation above and the Thermopolis Shale Formation below. The gross thickness of the formation varies from 10 to 40 feet. The average depth to the top of the Bear River Formation is 9,000 feet.

(157) *Austin Chalk Formation in Texas.* RM79-76-212 (Texas—38).

(i) *Delineation of formation.* The Austin Chalk Formation is found in Grimes County, Texas, Railroad Commission District 3. The area lies within a 2.5 mile radius around the Tenneco Oil Company L. R. Fuqua No. 1 well, located 5,200 feet from the North line and 1,500 feet from the east line of the John Bowman Survey, A-7.

(ii) *Depth.* The Austin Chalk Formation in the designated area is defined as the stratigraphic interval above the Eagleford Formation and below the Pecan Gap Formation. The top of the Austin Chalk Formation is found at 12,210 feet subsea, with the base at 12,484 feet subsea, in the L. R. Fuqua No. 1 Well.

(158) *Upper Wilcox (Mackhank) (First Tom Lyne) Formation in Texas.* RM79-76-162 (Texas—31).

(i) *Delineation of formation.* The Upper Wilcox (Mackhank) (First Tom Lyne) Formation is located in the southwestern portion of Live Oak County, Texas, Railroad Commission District 2, approximately five miles east of the townsite of Clegg, Texas, and consists of the following surveys: A. B. & M. 167 A-47, and 173 A-50, B. S. & F. 301 A-741, 29 A-132, 251 A-113, 253 A-114, 255 A-115, 257 A-116, 259 A-117, 177 A-92, 261 A-118, 181 A-94, 263 A-19, 265 A-120, 175 A-81, and 179 A-93, F. L. Beall 178 A-823, R. H. Brown 526 A-734, and 525 A-732, R. F. Byler 530 A-999, T. J. Davis 32 A-567, A. A. Dinn 182 A-941, 82 A-940, and 90 A-939, James Dinn 296 A-942, J.A. Dowdy 298 A-944, and 266 A-919, C. R. Evans 36 A-969, and 176 A-945, G. H. & RR. 1

A-198, G. M. & D. 4 A-214, F. E. Goodwin 2 A-640, H & G. N. RR. 45 A-249, and 47 A-248, D. Harris 7 A-235, J. A. Harrymans 174-A-922, Hooper & Wade 303 A-251, James Latham 3 A-275, R. McCampbell 262 A-929, 96 A-928, 94 A-927, and 50 A-926, Jno. McClane 48 A-765, L. A. McIntosh 31 A-542, J. Poitevent 95 A-378, 93 A-377, 49 A-350, 35 A-347, 31 A-363, 29 A-359, 95 A-1084, 91 A-376, and 89 A-375, Joe Russell 36 A-932, S. K. & K. 297 A-515, Pat Sheeran 254 A-783, O. B. & E. E. Shipp 92 A-811, J. M. Torres 62 A-884, O. Torres 60 A-882, Pedro Torres 61 A-883, 264 A-1023 and A-1083, and 50 A-1036 and A-926, W. Tullos 3 A-1037, G. I. Vanmeter 168 A-848, and 46 A-847, Geo. W. West 408 A-794, and 260 A-818, Ike West 3 A-822, Isaac West 258 A-819, and 186 A-820, Jacob White 174 A-955, O. P. Williams 6 A-487, W. Williams 67 A-908, and Jessie Wilson 2 A-995.

(ii) *Depth.* The average depth to the top of the Upper Wilcox (Mackhank) (First Tom Lyne) Formation is approximately 14,000 feet and the thickness is between 300 feet and 400 feet.

(159) *Lower Vicksburg (P through S) Sandstone in Texas.* RM 79-76-202 (Texas—37).

(i) *Delineation of formation.* The Lower Vicksburg (P through S) Sandstone is located in Hidalgo County, Texas, Railroad Commission District 4, approximately seven miles east of the city of La Reforma and includes approximately 16,000 acres in the north part of the "Santa Anita" Manuel Gomez A-63 Grant.

(ii) *Depth.* The top of the Lower Vicksburg (P through S) Sandstone is the top of the "P" sand which occurs at an average depth of about 10,600 feet in the western portion of the designated area. In the east, the "P" sand is found at a depth of about 12,000 feet. The top of the lowermost section of the designated sandstone, the "S" sand, occurs at an average depth of about 13,500

feet in the west. In the east, the "S" sand is found at a depth of about 13,000 feet. Total thickness is approximately 4,000 feet.

(160) *Lower Mississippian Little Valley Formation in Virginia.* RM79-76-211 (Virginia—2).

(i) *Delineation of formation.* The Lower Mississippian Little Valley Formation is found in Scott and Washington Counties, Virginia. The designated area consists of approximately 89 square miles comprising all of the Mendota and Wallace quadrangles south of the Holston River in Virginia.

(ii) *Depth.* The average depth to the top of the Lower Mississippian Little Valley Formation is 3,191 feet. The formation has an average thickness of 673 feet.

(161) *Berea Sandstone in Kentucky.* RM79-76-210 (Kentucky-2).

(i) *Delineation of formation.* The Berea Sandstone (called Berea grit by drillers) encompasses all of Pike County, Kentucky, with the exception of 14 irregularly-shaped areas as shown on maps on file with the Commission.

(ii) *Depth.* The Berea Sandstone occurs near the base of Mississippian-age deposits between the Sunbury Shale (called Coffee shale by drillers) and the Ohio Shale (called Devonian shale by drillers). The average depth of the top of the Berea Sandstone is 2,400 feet in western Pike County and increases to 3,500 feet in the eastern part of the county; however, the range of the depth to the top of the Berea is from the surface to 4,617 feet.

(162) *"Big Lime" Zone of the Greenbrier Group in West Virginia.* RM 79-76-244 (West Virginia-2 Addition).

(i) *Delineation of formation.* The "Big Lime" Zone of the Greenbrier Group is defined as the stratigraphic

interval overlying the "Keener" and "Big Injun" Zones of the Pocono Group and underlying the "Blue Monday" and "Little Lime" Zones of the Mauch Chunk Group. The "Big Lime" Zone is found in portions of Fayette, McDowell, Raleigh, Wyoming, Boone, Cabell, Kanawha, Lincoln, Logan, Mingo, Putman and Wayne Counties and all of Mercer County.

(ii) *Depth.* The depth to the top of the "Big Lime" Zone ranges from approximately 1,375 feet in the northwest portion to 3,100 feet along the eastern edge and ranges in thickness from approximately 150 feet in the west to a maximum thickness of approximately 1,800 feet in the southeastern portion of the designated area.

(163) *Dakota Formation in Colorado.* RM79-130 (Colorado—28).

(i) *Delineation of formation.* The Dakota Formation is located in Garfield, Mesa, and Rio Blanco Counties, Colorado, in all or parts of Townships 1 North, 1 South, 2 South, 3 South, Ranges 100 through 104 West, 6th P.M., Townships 4 and 5 South, Ranges 102 through 104 West, 6th P.M., Townships 6 through 8 South, Ranges 103 through 105 West, 6th P.M., Townships 9 and 10 South, Ranges 103 and 104 West, 6th P.M., and Townships 1 and 2 North, Ranges 2 and 3 West, Ute P.M.

(ii) *Depth.* The Dakota Formation is overlain by the Dakota Silt and is underlain by the Morrison Formation. The average thickness is about 150 feet. The average depth to the top of the Dakota Formation is 5,450 feet.

(164) *Morrison Formation in Colorado.* RM79-76-130 (Colorado—28).

(i) *Delineation of formation.* The Morrison Formation is located in Garfield, Mesa, and Rio Blanco Counties, Colorado, in all or parts of Townships 1 North, 1 South, 2 South, and 3 South, Ranges 100 through 104

West, 6th P.M., Townships 4 and 5 South, Ranges 102 through 104 West, 6th P.M., Townships 9 and 10 South, Ranges 103 and 104 West, 6th P.M., and Townships, 1 and 2 North, Ranges 2 and 3 West, Ute P.M.

(ii) *Depth.* The Morrison Formation is overlain by the Dakota Formation and is underlain by the Entrada Formation. The thickness ranges from about 300 to more than 600 feet. The average depth to the top of the Morrison Formation is 5,590 feet.

(165) *Granite Wash Formation in Texas.* RM79-76-164 (Texas—32).

(i) *Delineation of formation.* The Granite Wash Formation in the Anadarko Basin is located in the panhandle area of Texas Railroad Commission District 10. The designated area includes all of Hemphill and Roberts Counties; Sections 45 through 396 of Block 43, H&TC RR Survey, Lipscomb and Ochiltree Counties; Sections 89 through 152 of Block 13, T&NO RR Survey, Ochiltree County; and all sections north of an east-west line passing through the southern boundary of Section 21, Block A-9 in Wheeler County except Sections 3, 5, and 6, A.B.&M. Survey, and Section 4, Block L, J.M. Lindsey Survey.

(i) *Depth.* The Granite Wash Formation is that interval from the top of the A-1 zone to the base of the Granite Wash Formation. The top of the A-1 zone ranges in depth from 6,934 feet in Roberts County to 11,386 feet in Wheeler County.

(166) *Niobrara Formation in Colorado.* RM79-76-226 (Colorado-38).

(i) *Delineation of formation.* The Niobrara Formation is located in Weld County, Colorado, in Township 4 North, Range 68 West, Sections 4 through 6; and in Larimer County, Colorado, in Township 4 North, Range 69 West, Sections 1 through 10, 15 through 22; Township

5 North, Range 68 West, Sections 19 through 21, 28 through 33; Township 5 North, Range 69 West, Sections 25 through 36, 6th P.M.

(ii) *Depth.* The average depth to the top of the Niobrara Formation is 3,000 feet. The Niobrara Formation averages 300 feet in thickness.

(167) Muddy Formation in Wyoming. RM79-76-189 (Wyoming-16).

(i) *Delineation of formation.* The Muddy Formation is located in Natrona County, Wyoming, in Township 36 North, Range 86 West, 6th P.M., Sections 4 through 9, Sections 15 through 22, and Sections 28 through 30; Township 36 North, Range 87 West, 6th P.M., Sections 1 through 3, Sections 11 through 14, NE¼ of Section 23, and N½,, N½ S½ of Section 24; Township 37 North, 86 West, 6th P.M., Sections 19, 20, and 28 through 33; Township 37 North, Range 87 West, 6th P.M., Sections 23 through 26, and Sections 35 and 36.

(ii) *Depth.* The vertical limits of the Muddy Formation are defined as the Mowry Shale above, and the Thermopolis Shales below. The average depth to the top of the formation is 19,800 feet.

(168) Lakota Formation in Wyoming. RM79-76-189 (Wyoming-16).

(i) *Delineation of formation.* The Lakota Formation is located in Natrona County, Wyoming, in Township 36 North, Range 86 West, 6th P.M., Sections 4 through 9, Sections 15 through 22, and Sections 28 through 30; Township 36 North, Range 87 West, 6th P.M., Sections 1 through 3, Sections 11 through 14, NE¼ of Section 23, and N½, N½ S½ of Section 24; Township 37 North, 86 West, 6th P.M., Sections 19, 20, and 28 through 33; Township 37 North, Range 87 West, 6th P.M., Sections 23 and 26, and Sections 35 and 36.

(ii) *Depth.* The vertical limits of the Lakota Formation are defined as the Thermopolis Shale above, and the Morris Shale below. The average depth to the top of the formation is 20,020 feet.

(169) Morrison Formation in Wyoming. RM79-76-189 (Wyoming-16).

(i) *Delineation of formation.* The Morrison Formation is located in Natron County, Wyoming in Township 36 North, Range 86 West, 6th P.M., Sections 4 through 9, Sections 15 through 22, and Sections 28 through 30; Township 36 North, Range 87 West, 6th P.M., Sections 1 through 3, Sections 11 through 14, NE¼ of Sections 23, N½, N½ S½, of Section 24; Township 37 North, 86 West, 6th P.M., Sections 19, 20 and 28 through 33; Township 37 North, Range 87 West, 6th P.M., Sections 23 through 26, and Sections 35 and 36.

(ii) *Depth.* The vertical limits of the Morrison Formation are defined as the Lakota Shale above, and the Sundance Shale below. The average depth to the top of the formation is 20,100 feet.

(170) Sundance Formation in Wyoming. RM79-76-189 (Wyoming-16).

(i) *Delineation of formation.* The Sundance Formation is located in Natrona County, Wyoming, in Township 36 North, Range 86 West, 6th P.M., Sections 4 through 9, Sections 15 through 22, and Sections 28 through 30; Township 36 North, Range 87 West, 6th P.M., Sections 1 through 3, Sections 11 through 14, NE¼ of Section 23, and N½, N½ S½ of Section 24; Township 37 North, 86 West, 6th P.M., Sections 19, 20, and 28 through 33; Township 37 North, Range 87 West, 6th P.M., Sections 23 through 26, and Sections 35 and 36.

(ii) *Depth.* The vertical limits of the Sundance Formation are defined as the Morrison Shale above, and the Triassic Shale below. The average depth to the top of the formation is 20,300 feet.

(171) *Vicksburg Formation in Texas.* RM79-76-088 (Texas 15).

(i) *The Deep Vicksburg Formation in Starr County, Texas.*

(A) *Delineation of formation.* The Deep Vicksburg Formation covers an area of approximately 4.8 square miles in portions of the Ygnacio Flores A-725 and Nicolasa Salinas A-411 surveys located in eastern Starr County, Texas, Railroad Commission District 4.

(B) *Depth.* The top of the Deep Vicksburg Formation is defined as the top of the 9250′ sand, or the unconformity where the 9250′ sand has been eroded. The base of the formation is the base of the V-23 sand.

(ii) *The Lower Vicksburg Formation in Starr County, Texas.*

(A) *Delineation of formation.* The Vicksburg Formation is located in Railroad Commission District 4 in the eastern half of Starr County, Texas.

(B) *Depth.* The top of the Vicksburg Formation is defined as the top of the Rincon Sand and the base as the top of the Yegua sand. Specifically, it is defined as that interval on the log of the Corpus Christi Oil and Gas Company, Heard #1 Well that occurs between a measured depth of 8,260 feet to 10,836 feet, which yields a gross thickness of 2,217 feet.

(172) *Injun Zone of the Pocono Group in West Virginia.* RM79-76-137 (West Virginia-1 Addition II).

(i) *Delineation of formation.* The Injun Zone is a depositional unit of Mississippian age. It is located in the Appalachian Basin in Boone, Cabell, Kanawha, Lincoln, Logan, Mingo, Putnam and Wayne Counties, in southwestern West Virginia, with certain specified excluded areas. (A map showing the excluded areas is on file with the Commission.)

(ii) *Depth.* The designated zone has a depth ranking from 1,200 feet to 3,000 feet. The top of the zone is marked by the base of the Greenbrier Group, and the zone is separated below from the Berea Sandstone of the Pocono Group by an interval of interbedded sandstones and shales (which may include the Squaw and Weir zones) ranging from 350 to 700 feet thick. The Injun zone has a thickness ranging from 10 to 75 feet.

(173) *Squaw zone of the Pocono Group in West Virginia.* RM79-76-127 (West Virginia-1 Addition II).

(i) *Delineation of formation.* The Squaw zone is a depositional unit of Mississippian age. It is located in the Appalachian Basin in Boone, Cabell, Kanawha, Lincoln, Logan, Mingo, Putnam, and Wayne Counties in Southwestern West Virginia, with certain specified excluded areas. (A map showing the excluded areas is on file with the Commission.)

(ii) *Depth.* The designated zone has a depth ranging from 1,250 to 3,000 feet where it is present in the stratigraphic sequence. The zone is separated from the Greenbrier Group above by a sequence of the interbedded sandstones and shales (which may include the Injun zone) ranging from 10 to 75 feet thick. It is separated below from the Berea Sandstone by a sequence of sandstones and shales (which may include the Weir zone) approximately 450 feet thick. The zone has a thickness ranging from 0 to 10 feet.

(17) *Weir zone of the Pocono Group in West Virginia.* RM79-76-127 (West Virginia-1 Addition II).

(i) *Delineation of formation.* The Weir zone is a depositional unit of Mississippian age. It is located in the Appalachian Basin in Boone, Cabell, Kanawha, Lincoln, Logan, Mingo, Putnam, and Wayne Counties in southwestern West Virginia, with certain specified excluded areas. (A map showing the excluded areas is on file with the Commission.)

(ii) *Depth.* The designated zone has a depth ranging from 2,000 to 2,250 feet where it exists in the stratigraphic sequence. The zone is separated from the Greenbrier Group above by a sequence of interbedded sandstones and shales (which may include the Injun and Squaw zones) ranging from 100 to 200 feet thick. It is separated from the Berea Sandstone below a sequence of interbedded sandstones and shales approximately 400 feet thick. The zone has a thickness ranging from 0 to 100 feet.

(175) *Berea Sandstone of the Pocono Group in West Virginia.* RM79-76-127 (West Virginia-1 Addition II).

(i) *Delineation of formation.* The Berea Sandstone is a depositional unit of Mississippian age. It is located in the Appalachian Basin in Boone, Cabell, Kanawha, Lincoln, Logan, Mingo, Putnam, and Wayne Counties in southwestern West Virginia, with certain specified excluded areas. (A map showing the excluded areas is on file with the Commission.)

(ii) *Depth.* The designated formation has a depth ranging from 1,600 to 3,450 feet. The formation is separated from the Greenbrier Group above by a sequence of interbedded shales and sandstones (which may include the Injun, Squaw, and Weir zones) ranging from 360 to 775 feet thick. It overlies the Bedford Shale of Mississippian age, where present, or shales of Devonian age. The formation ranges from 5 to 125 feet thick.

(176) *Venango Group in Pennsylvania.* RM79-76-206 (Pennsylvania—2).

(i) *Delineation of formation.* The Venango Group underlies Fayette, Westmoreland, Indiana Counties, Jefferson County excluding the townships of Barnett and Heath, and eastern Armstrong County including the townships of Pine, Mahoning, Redbank, Wayne, Boggs, Rayburn, Valley, Cowanshannock, Plumcreek, Kittan-

ning, Manor, Bethel, Burrell, South Bend, Kiskiminetas, Parks, and Gilpin. Excluded from the designated area are any known "sweet spots," and all areas identified by Pennsylvania in its recommendation on July 5, 1983, as gas storage areas or oil pools. The Venango Group consists of a sequence of interbedded sandstones and shales of the Upper Devonian System. The Venango Group is the younger of two Upper Devonian sand packages which are bounded by the overlying Mississippian Pocono Group and the underlying Upper Devonian Brallier Shale or its equivalent. The following sands are included in the Venango Group: Hundred Foot, Shannopin, Fifty Foot, Gantz, Upper Nineveh, Lower Nineveh, Snee, Boulder, Hickory, Blue Monday, Gordon, Gordon Stray, 2nd Butler, 1st Venango, Rosenberry, 2nd Venango, Shira, 3rd Venango, 3rd Venango Stray, 3rd, 4th and 5th Knox, Clarion, Byram, Fifth, Bayard, and Elizabeth.

(ii) *Depth.* The average subsurface depth to the top of the Venango Group is approximately 1,500 feet. The thickness of the formation ranges from 500 feet along the western edge of the designated area to 800 feet along the eastern edge.

(177) *Bradford Group in Pennsylvania.* RM79-76-207 (Pennsylvania—3).

(i) *Delineation of formation.* The Bradford Group underlies Fayette, Westmoreland, and Indiana Counties, Jefferson County excluding the townships of Barnett and Heath, and eastern Armstrong County including the townships of Pine, Mahoning, Redbank, Wayne, Boggs, Rayburn, Valley, Cowanshannock, Plumcreek, Kittanning, Manor, Bethel, Burrell, South Bend, Kiskiminetas, Parks, and Gilpin. Excluded from the designated area are any known "sweet spots," and all areas identified by Pennsylvania in its recommendation on July 5, 1983, as gas storage areas or oil pools. The Bradford Group consists of a sequence of interbedded sandstones and shales of the Upper Devonian System. The Bradford Group is

the older of two sand packages which are bound by the overlying Mississippian Pocono Group and the underlying Upper Devonian Brallier Shale or its equivalent. The following sands are included in the Bradford Group: 1st and 2nd Warren, Speechley, Tiona, Balltown, Sheffield, 1st, 2nd, and 3rd Bradford, and Kane.

(ii) *Depth.* The average subsurface depth to the top of the Bradford Group is approximately 2,500 feet. The thickness of the formation ranges from near zero along the western edge of the designated area to approximately 1,300 feet along the eastern edge.

(178) *Catskill/Lock Haven Formation in Pennsylvania.* RM79-76-208 (Pennsylvania—4).

(i) *Delineation of formation.* The "Catskill/Lock Haven" Formation underlies Cambria and Clearfield Counties, western Clinton County including the townships of Noyes, Leidy, East Keating, and West Keating, southern Cameron County including the townships of Grove and Gibson, and southeastern Elk County including the townships of Benezette and Jay. Excluded from the designated area are any known "sweet spots," and all areas identified by Pennsylvania in its recommendation on July 5, 1983, as gas storage areas or oil pools. The "Catskill/Lock Haven" Formation consists of a sequence of interbedded sandstones and shales of the Upper Devonian System which underlies the Mississippian Pocono Group and overlies the Upper Devonian Brallier Shale or its equivalent. The following sands are included in the "Catskill/Lock Haven" Formation: Hundred Foot, Fifth, Bayard, Elizabeth, Warren, Speechley, Balltown, Sheffield, Tiona, 1st, 2nd, and 3rd Bradford, and Kane.

(ii) *Depth.* The average subsurface depth to the top of the "Catskill/Lock Haven" Formation is approximately 1,400 feet. The thickness of the formation ranges from approximately 1,500 to 3,500 feet.

(179) *Pictured Cliffs Formation in New Mexico.* RM79-76-204 (New Mexico—25).

(i) *Delineation of formation.* The Pictured Cliffs Formation is located in Rio Arriba and Sandoval Counties, New Mexico, in Township 22 North, Range 2, 3, 4 and 5 West, all; Township 23 North, Range 2 West, Sections 5 through 9, 16 through 21, and 25 through 36; Township 23 North, Ranges 3, 4 and 5 West, all Sections; Township 24 North, Range 3 West, Sections 19, 20, 26 through 35, and S½ of 36; Township 24 North, Range 4 West, Sections 3 through 10 and 13 through 36; Township 24 North, Range 5 West, all Sections; Township 25 North, Range 4 West, Sections S½ of 30, 31 and 32; Township 25 North, Range 5 West, Sections 15 through 23 and S½ of 24, and 25 through 36, NMPM.

(ii) *Depth.* The Picture Cliffs Formation is defined as that interval at a depth of approximately 3,046 feet to 3,141 feet on the Induction Electric Log from the John E. Schalk, Cinco Diablos Well No. 6. The average depth to the top of the Pictured Cliffs Formation is 2,685 feet.

(180) *Dakota Formation in New Mexico.* RM79-76-218 (New Mexico—26).

(i) Delineation of formation. The Dakota Formation is located in San Juan County, New Mexico, in Township 25 North, Range 9 West, Section 16, 17 E½, 28 W½, 29 E½ and 30 W½ NMPM; Township 25 North, Range 10 West, Section 25 W½, NMPM.

(ii) *Depth.* The Dakota formation is defined as that interval at a depth of approximately 6,234 feet to 6,599 feet on the Induction Spherically Focused Log from the M.J. Brannon 28 No. 2 well. The average depth to the top of the Dakota formation is 6,400 feet.

(181) *"Maxon" sands of the Mauch Chunck Group and the "Injun-Weir" sands of the Pocono Group in Virginia.* RM79-76-217 (Virginia-3).

(i) *Delineation of formation.* The "Maxon" sands and the "Injun-Weir" sands underlie all of Dickenson and Buchanan Counties and portions of Lee, Scott, Wise, Russell, and Tazewell Counties, Virginia.

(ii) *Depth.* The average depth to the top of the "Maxon" sands ranges from 2,610 feet in the eastern portion to 2,930 feet in the western portion of the designated area. The average depth to the top of the "Injun-Weir" sands ranges from 3,855 feet in the eastern portion of 4,040 feet in the western portion of the designated area.

(182) *Strawn Formation in Texas.* RM79-232 (Texas —40).

(i) *Delineation of formation.* The Strawn Formation is found in the western part of the State of Texas. The designated area lies primarily in the extreme western part of Sutton County, and extends north into the southwest part of Schleicher County, and to the west into the eastern part of Crockett County.

(ii) *Depth.* The vertical limits of the Strawn Formation are defined by the Canyon sand and shale formations above and the Atoka formation below. The depth to the top of the formation is approximately 7,383 feet in the northeast part of the designated area and dips to 9,858 feet in the southwest, having an average depth of 8,300 feet to the top of the formation. In a type log, the Amoco Production Company Edwin S. Mayer, Jr. No. C-8 well, located in the northern part of the designated area, the thickness of the Strawn Formation is 306 feet. A gradual thickening of the formation occurs toward the south part of the designated area.

(183) *Morrow Formation in New Mexico.* RM79-76-234 (New Mexico-27).

(i) *Delineation of formation.* The Morrow Formation is located in Lea County, New Mexico, in Township 24

South, Range 33 East, NMPM, Section 11 through 14, 23 through 26, and 35 and 36 Township 24 South, Range 34 East, NMPM, Section 8 S/2, 9 S/2, 14 W/2, 15 through 17, 19 through 22, 23 W/2, 26 W/2, 27 through 34, and 35 W/2.

(ii) *Depth.* The Morrow Formation has a gross pay thickness of approximately 96 feet and begins at the base of the Atoka Formation and extends to the top of the Chester Formation. The average depth to the top of the Morrow Formation is 14,287 feet.

(184) *Niobrara Formation in Colorado.* RM79-76-235 (Colorado-39).

(i) *Delineation of formation.* The designated area is tion is located in Weld County, Colorado, in Township 4 North, Range 66 West, 6th P.M., Sections 2 through 10, and 15 through 18; Township 5 North, Range 64 West, 6th P.M., Sections 1 through 24; Township 5 North, Range 65 West, 6th P.M., Section 1; Township 5 North, Range 66 West, 6th P.M., Sections 2 through 11, and 14 through 35; Township 5 North 67 West, 6th P.M., Sections 1 through 3, 11 through 14, 23 and 24; Township 6 North, Range 64 West, 6th P.M., Sections 7, and 13 through 36; Township 6 North, Range 65 West, 6th P.M., Sections 7 through 31, and 34 through 36; Township 6 North, Range 66 West, 6th P.M., Sections 6 through 36; Township 6 North, Range 67 West, 6th P.M., all Sections; and in Larimer County, Colorado, in Township 6 North, Range 68 West, 6th P.M., Sections 1 and 2, 11 through 14, 23 through 26, 35 and 36.

(ii) *Depth.* The Niobrara Formation is defined as that interval which begins at a depth of approximately 6,900 feet and varies in thickness from 280 feet to 320 feet.

(185) The Berea Sandstone and "Second Berea" zone of the Pocono Group and the "Gordon" zone of the

Hampshire Group in West Virginia. RM79-76 (West Virginia—4).

(i) *Delineation of formation.* The Berea Sandstone, "Second Berea" zone, and "Gordon" zone underlie portions of Jackson, Mason, and Wood Counties. The Berea Sandstone lies immediately below the Sunbury Shale and the "Gordon" zone lies above the "Brown Shale" zone.

(ii) *Depth.* The average depth to the top of the Berea Sandstone and "Second Berea" zone ranges from 1,500 feet in western Mason County to over 2,700 feet in eastern Jackson County. The average depth to the top of the "Gordon" zone ranges from 2,538 feet in Wood County to 2,852 feet in Jackson County.

(186) Arbuckle Formation in Arkansas. RM79-76-223 (Arkansas-1).

(i) *Delineation of formation.* The Arbuckle Formation is found in White County, Arkansas. The designated area includes Sections 1, 2, 11, 12, 13, and 14 of Township 8 North, Range 8 West, and Sections 6, 7, and 18 of Township 8 North, Range 7 West.

(ii) *Depth.* The Arbuckle Formation's vertical limits are defined by the Everton Formation above and the Cambrian sequence below. The depth to the top of the formation averages 6,400 feet and the gross thickness varies from approximately 1,000 to 1,500 feet.

(187) *"Corniferous-Big Six" Formation of the Hunton Group and the "Clinton" Formation of the Crab Orchard Group in Kentucky.* RM79-76-241 (Kentucky—4).

(i) *Delineation of formations.* The "Corniferous-Big Six" Formation of the Hunton Group and the "Clinton" Formation of the Crab Orchard Group is found in Lawrence and Johnson Counties, Kentucky. Several areas in these counties are excluded from the designation and are shown on maps on file with the Commission.

(ii) *Depth.* The average depth to the top of the "Corniferous-Big Six" Formation ranges from 2,900 feet in the east to 1,750 feet in the west and has a thickness ranging from 500 feet to 775 feet. It is overlain by the Devonian Ohio Shale and underlain by the Silurian Rose Hill Shale. The average depth to the top of the "Clinton" Formation ranges from 2,460 feet in the west to 4,050 feet in the east and has thickness ranging from 0 to 35 feet. It is overlain by the Rose Hill Shale and underlain by the Brassfield Dolomite.

(188) *Dakota Formation in Utah.* RM79-76-136 (Utah—5).

(i) *Delineation of formation.* The Dakota Formation is located in Grand and Uintah Counties, Utah, in the area of Township 12 South, Ranges 21 through 25 East; Township 13 South, Ranges 20 through 26 East; Township 14 South, Ranges 20 through 26 East; Township 15 South, Ranges 20, W/2 21, N/2 23, and 24 through 26 East; and Township 15½ South, Range 24, Sections 33 through 36, and Ranges 25 and 26 East.

(ii) *Depth.* The Dakota Formation's vertical limits are defined by the Dakota Silt Formation above and the Morrison Formation below. The average thickness throughout the proposed area is approximately 200 feet and the average depth to the top of the Dakota Formation is 8,925 feet.

(189) *Niobrara Formation in Colorado.* RM79-76-240 (Colorado—40).

(i) *Delineation of formation.* The Niobrara Formation is located in Adams County, Colorado, in Township 1 South, Range 68 West, Sections 1 through 24; in Boulder County, Colorado, in Township 1 South, Range 69 West, Sections 1 through 24; Township 1 North, Range 69 West, Sections 1 through 36; and in Weld County, Colorado, in Township 1 North, Range 68 West, Sections 1 through 36, 6th P.M.

(ii) *Depth.* The average depth to the top of the Niobrara Formation is 7,600 feet. The Niobrara Formation varies in thickness from 250 to 450 feet.

(190) *Niobrara Formation in Colorado.* RM79-76-245 (Colorado—40 Addition).

(i) *Delineation of formation.* The Niobrara Formation is located in Adams County, Colorado, in Township 1 South, Range 67 West, Sections 1 through 36; Township 1 South, Range 68 West, Sections 25 through 36; and in Weld County, Colorado, in Township 1 North, Range 67 West, Section 32 S/2, 6th P.M.

(ii) *Depth.* The average depth to the top of the Niobrara Formation is 7,500 feet. The Niobrara Formation varies in thickness from 250 to 450 feet.

(191) *Strawn Formation in Texas.* RM79-76-237 (Texas—40) *Massie (Strawn) Field, Crockett and Val Verde Counties.*

(i) *Delineation of formation.* The designated area is located approximately 25 miles south of Ozona, Texas, along the common Crockett and Val Verde County lines. The designated area is specifically located in the eastern half of Section 13; the entire portion of Sections 14, 15, 16, 25, 26, 27, 28, 52, 53, 54, 55, 56, 65, 66, 67, 68, 69, 92, 93, 94, 95, 96, 105, 106, 107, 108 and 109 of Block O, GH & SA RR Survey; Section 95 of Block A, TC RR Survey; and Section 182 of Block O, M.A. Sharp Survey.

(ii) *Depth.* The average depth to the top of the designated area is 11,165 feet and the thickness varies from approximately 200 feet on the top of the Massie (Strawn) Field anticline to over 550 feet off structure.

(192) *Turner Formation in Wyoming.* RM79-76-242 Wyoming 18).

(i) *Delineation of formation.* The Turner Formation underlies approximately 85,760 acres within Campbell

and Converse Counties, Wyoming, in Township 40 North, Range 69 West, 6th P.M., Sections 7, 18, 19, 30, and 31; Township 40 North, Range 70 West, 6th P.M., All Sections; Township 40 North, Range 71 West, 6th P.M., Sections 1, 2, 3, 11, 12, and 13; Township 41 North, Range 70 West, 6th P.M., Sections 4 through 9, 16 through 22, and 25 through 36; Township 41 North, Range 71 West, 6th P.M., Sections 1 through 5, 8 through 17, 20 through 26, 28, 34, 35, and 36; Township 42 North, Range 70 West, 6th P.M., Sections 18, 19, 30, and 31; Township 42, Range 71 West, 6th P.M., Sections 1 through 22, 24, 25, 27 through 29, and 32 through 36.

(ii) *Depth.* The Turner Formation's vertical limits are defined by the Sage Breaks Shale Formation above and the Carlile Shale Formation below. The average depth to the top of the Turner Formation is 9,400 feet and has an average thickness of 30 feet.

(193) *"Riley-Benson" zones of the Chemung Group in West Virginia.* RM79-76-135 (West Virginia—3).

(i) *Delineation of formation.* The "Riley-Benson" zones cover an area of approximately 3,197 square miles in portions of Barbour, Doddridge, Gilmer, Harrison, Lewis, Upshur, and Randolph Counties, West Virginia.

(ii) *Depth.* The "Riley-Benson" interval is approximately 350 feet in thickness. The top of the "Riley-Benson" zones interval ranges from 5,200 feet in the western portion to 3,000 feet in the eastern portion with the average depth to the top of the interval being 3,783 feet.

(194) *Barnett Shale Formation in Texas.* RM79-76 (Texas—39).

(i) *Delineation of formation.* The Barnett Shale Formation is found in Texas in all of Wise County and the western one-half of Denton county, Railroad Commission District 9; and the north-western one-quarter of Tarrant County, Railroad Commission District 5. The designated area covers 1,592 square miles.

(ii) *Depth.* The Barnett Shale Formation in the designated area lies uncomformably over the Ordovician (Ellenburger) and lies below the Barnett Lime or Pennsylvanian Morrow. The depth to the top of the Barnett Shale Formation varies from an estimated sub-sea depth of 4,800 feet in Wise County to 7,900 feet in Tarrant County, with an approximate thickness ranging from 236 feet in Wise County to 300 feet in Tarrant County. A typical Barnett Shale section occurs between the electric log depths of 7,194 feet and 7,444 feet on the well log of the Mitchell Energy Corporation C. W. Slay No. 1 well.

(195) *Upper Marchand Sand of the Hoxbar Group in Oklahoma.* RM79-76-246 (Oklahoma—7).

(i) *Delineation of formation.* The Upper Marchand Sand of the Hoxbar Group is found in Section 11, Township 3 North, Range 9 West, in Comanche County, Oklahoma.

(ii) *Depth.* The depth of the top of the Upper Marchand Sand is 9,976 feet. The average net thickness of the recommended zone is 50 feet. The recommended zone consists of the upper half of the Marchand Sand. The Marchand Sand is overlain by the Medrano Sandstone and underlain by the Culp-Melton Zone.

(196) *Hosston Formation in Louisiana.* RM79-76 (Louisiana—7).

(i) *Delineation of formation.* The Hosston Formation is located in Township 12 North, Ranges 7, 8, and 9 West; Township 13 North, Ranges 7, 8, and 9 West; and Township 14 North, Ranges 7, 8, and 9 West; comprising approximately 324 square miles of portions of Bienville, Natchitoches, and Red River Parishes, Louisiana.

(ii) *Depth*: The Hosston Formation is defined as being that gas and condensate bearing sand encountered between the measured depths of 7,320 feet and 10,090

feet on the induction electrical log of the Amerada Hess Corporation—Placid Oil Company—Charles Beach Jr. No. 1 well, located in section 34, Township 12 North, Range 8 West, Red River Parish, Louisiana.

(197) *Dakota Producing Interval in New Mexico.* RM 79-76 (New Mexico—14).

(i) *Delineation of formation.* The Dakota Producing Interval is located in Township 31 North, Range 13 West, sections 1 through 12, sections 14 through 21, sections 28 through 32, NMPM, San Juan County, New Mexico. The interval is within the Basin—Dakota Gas Pool, in the northwestern portion of the San Juan Basin near the Hogback Monocline.

(ii) *Depth.* The Dakota Producing Interval is composed of the Granerous Shale Formation, the Dakota Formation, and the productive upper portion of the Morrison Formation. The average depth to the top of the Dakota Formation is 6,544 feet. Gross thickness of the interval is approximately 400 feet.

(198) *The Maxton, Little Lime, and Blue Monday zones of the Mauch Chunk Group; the Big Lime and Keener zones of the Greenbrier Group; and the Big Injun and Squaw zones of the Pocono Group underlying portions of Braxton and Clay Counties, West Virginia.* RM 79-76-233 (West Virginia—5)

(i) *Delineation of formation.* The Maxton zone underlies the Salt Sands zone of the Pottsville Group of Pennsylvania age and overlies the Little Lime zone of the Mauch Chunk Group. The Little Lime zone underlies the Maxton zone and overlies the Blue Monday zone of the Mauch Chunk Group. The Blue Monday zone underlies the Little Lime zone and overlies the Big Lime zone of the Greenbrier Group. The Big Lime zone underlies the Blue Monday zone and overlies the Keener zone of the Greenbrier Group. The Keener zone underlies the Big Lime zone and overlies the Big Injun zone of the Pocono

Group. The Big Injun zone underlies the Keener zone and overlies the Squaw zone of the Pocono Group. The Squaw zone underlies the Big Injun zone and overlies the Weir zone of the Pocono Group.

(ii) *Depth.* The average depth to the top of each of the zones is as follows: Maxton, 1,550 feet; Little Lime, 1,650 feet; Blue Monday, 1,685 feet; Big Lime, 1,735 feet; Keener, 1,845 feet; Big Injun, 1,865 feet; and Squaw, 2,025 feet.

(Natural Gas Policy Act of 1978, 15 U.S.C. 3301-3432 (1982); Department of Energy Organization Act, 42 U.S.C. 7101-7352 (1982): E.O. 12009, 3 CFR Part 142 (1978); Administrative Procedure Act, 5 U.S.C. 553 (1982))

[Order 99, 45 FR 56044, Aug. 22, 1980]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 271.703, see the List of CFR Sections Affected in the Finding Aids section of this volume.

APPENDIX F

Pursuant to Rule 28.1, Petitioner lists their parent companies (other than wholly owned subsidiaries) and affiliates. ARCO Oil and Gas Company is a Division of The Atlantic Richfield Company whose stock or debt securities are publicly traded in the United States. The subsidiaries and affiliates of The Atlantic Richfield Company not wholly owned are:

Alyeska Pipeline Service Company
Anamax Mining Company
Badger Pipeline Company
Black Lake Pipe Line Company
Caribou-Chaleur Bay Mines Ltd.
Colonial Pipeline Company
Cook Inlet Pipe Line Company
Dixie Pipeline Company
East Texas Salt Water Disposal Company
85819 Canada Limited
Eisenhower Mining Company
Flower Street Limited
Kanai Pipe Line Company
Kuparuk Transportation Company
Las Quintas Serenas Water Company
Park Cummings Mining Company
Park-Premier Mining Company
Platte Pipe Line Company
Prince Consolidated Mining Company
Rodman, Inc.
Smoke House Copper Mining Company
Tecumseh Pipe Line Company
Texas-New Mexico Pipe Line Company